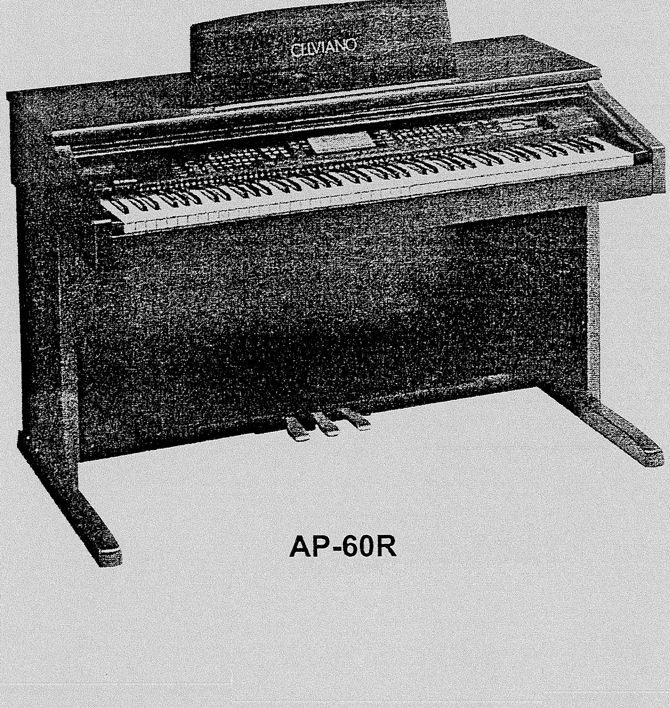
CASIO®

Service Manual

(without price)

AP-60R

JUNE.1999



AP-60R

ELECTRONIC KEYBOARD

CONTENTS

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Disassembly Instructions 5
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SAFETY NOTICE

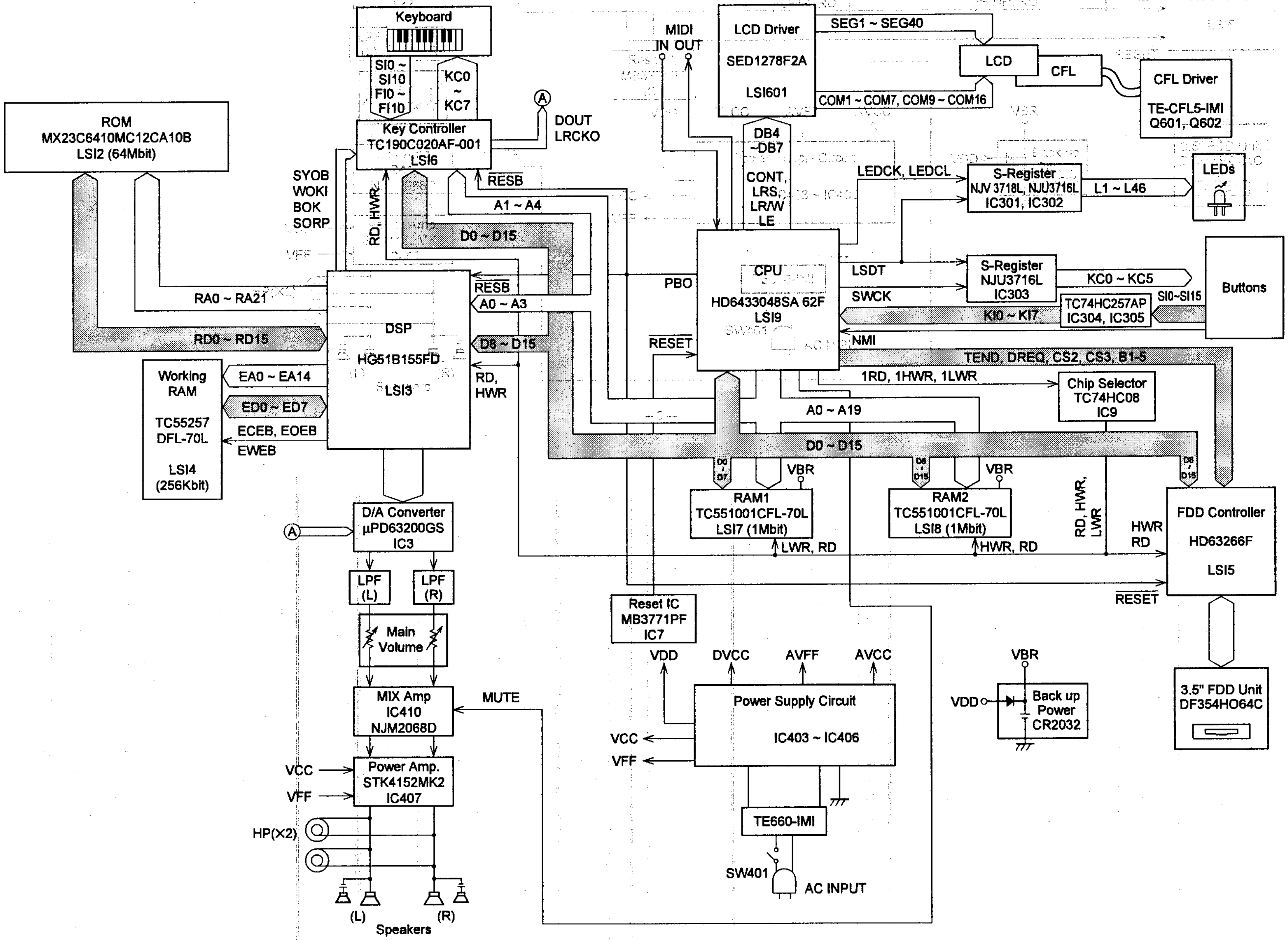
CAUTION!
Danger of explosion if battery is incorrectly replaced.
Replace only with the same of equivalent type recommended by the appliance manufacturer.Discard used batteries according to manufacturer's instructions.

SPECIFICATIONS

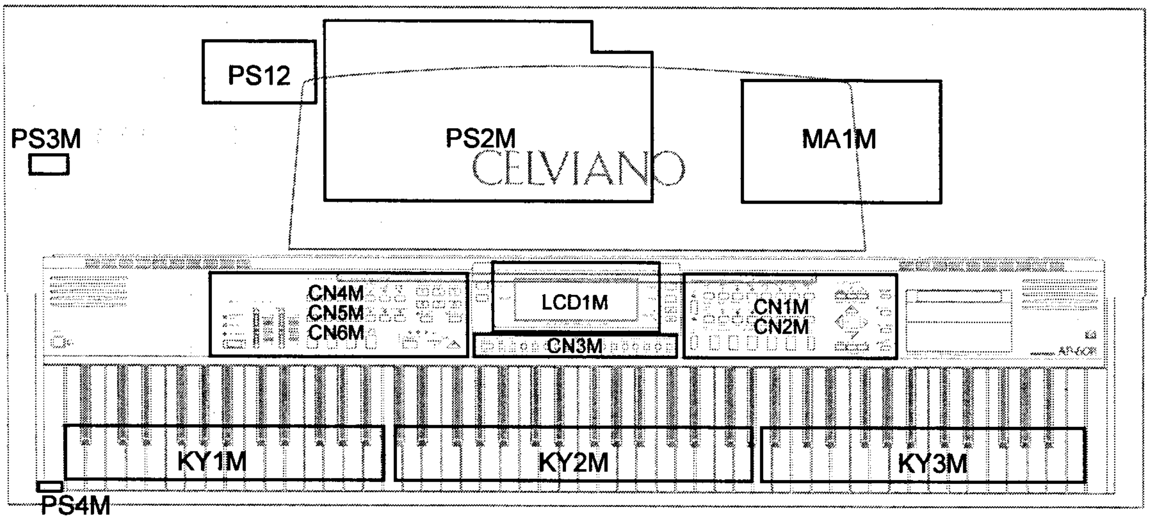
GENERAL

Number of keys	88	
Polyphonic:	32-note	
Preset tones:	72, Tone, Tempo, Layer, Auto-Harmonize	
Key transpose:	±12 semitone	
Effects:	10, Reverb (1, 2, 3), Chorus, Tremolo, Phase Shifter, Organ Speaker, Enhancer, Flanger, Loudness	
Demo tunes:	12	
Memory:	Number of Songs:	2
	System:	Real-time recording
	Memory Capacity:	Approximately 4,900 notes total
	Memory Backup Battery:	Built-in lithium battery Battery Life: Approximately 5 years
Pedals:	Soft, Sostenuto, Damper	
Tuning control:	440Hz ±50 cents	
Built-In Speakers:	16 cm dia. x 2 + 5 cm dia. x 2 (Output: approx. 30 W + 30 W)	
MIDI:	16-channel, multi-timbral reception	
Terminals:	PHONES 1 and 2, MIDI (IN/OUT/THRU), LINE OUT L and R (Output Impedance: 1.1 KΩ; Output Voltage: 3.5 V, RMS, max.), LINE IN R and L (Input Impedance: 32 KΩ, Input sensitivity: 200 mV)	
Power source:	120V (for Taiwan, Brazil, Mexico, USA, Canada), 220V, 230V and 240V (for other countries)	
Power consumption:	91W (with 120V AC), 97W (with 220V, 230V and 240V AC)	
Dimensions (HWD):	Without stand:	219 × 1376 × 592 mm (8-5/8 × 54-3/16 × 23-5/16 inches)
	With stand:	850 × 1376 × 592 mm (33-1/2 × 54-3/16 × 23-5/16 inches)
Weight:	Without stand:	53.0 kg (117.0 lbs)
	With stand:	66.0 kg (145.7 lbs)

BLOCK DIAGRAM


Keyboard
SI0 ~ SI10
FI0 ~ FI10
KC0 ~ KC7
Key Controller
TC190C020AF-001
LSI6
A
DOUT
LRCKO
ROM
MX23C6410MC12CA10B
LSI2 (64Mbit)
SYOB
WOKI
BOK
SORP
RD, HWR
RESB
A1 ~ A4
D0 ~ D15
RA0 ~ RA21
RD0 ~ RD15
DSP
HG51B155FD
LSI3
RESB
A0 ~ A3
D8 ~ D15
RD, HWR
Working RAM
TC55257
DFL-70L
LSI4
(256Kbit)
EA0 ~ EA14
ED0 ~ ED7
ECEB, EOEB
EWEB
D/A Converter
µPD63200GS
IC3
A
LPF (L)
LPF (R)
Main Volume
MIX Amp
IC410
NJM2068D
MUTE
Power Amp.
STK4152MK2
IC407
VCC
VFF
HP(X2)
(L)
(R)
Speakers
MIDI
IN OUT
LCD Driver
SED1278F2A
LSI601
SEG1 ~ SEG40
COM1 ~ COM7, COM9 ~ COM16
LCD
CFL
CFL Driver
TE-CFL5-IMI
Q601, Q602
DB4 ~DB7
CONT, LRS, LR/W LE
LEDCK, LEDCL
S-Register
NJV 3718L, NJU3716L
IC301, IC302
L1 ~ L46
LEDs
CPU
HD6433048SA 62F
LSI9
PBO
RESET
LSDT
SWCK
NMI
S-Register
NJU3716L
IC303
KC0 ~ KC5
TC74HC257AP
IC304, IC305
SI0~SI15
KI0 ~ KI7
Buttons
TEND, DREQ, CS2, CS3, B1-5
1RD, 1HWR, 1LWR
Chip Selector
TC74HC08
IC9
A0 ~ A19
D0 ~ D15
D0 ~ D7
D8 ~ D15
D8 ~ D15
VBR
VBR
RAM1
TC551001CFL-70L
LSI7 (1Mbit)
LWR, RD
RAM2
TC551001CFL-70L
LSI8 (1Mbit)
HWR, RD
RD, HWR, LWR
HWR
RD
FDD Controller
HD63266F
LSI5
RESET
3.5" FDD Unit
DF354HO64C
Reset IC
MB3771PF
IC7
VDD
DVCC
AVFF
AVCC
Power Supply Circuit
IC403 ~ IC406
VCC
VFF
TE660-IMI
SW401
AC INPUT
VBR
VDD
Back up Power
CR2032

PCB LAYOUT


PS12
PS3M
PS2M
CELVIANO
MA1M
CN4M
CN5M
CN6M
LCD1M
CN3M
CN1M
CN2M
KY1M
KY2M
KY3M
PS4M

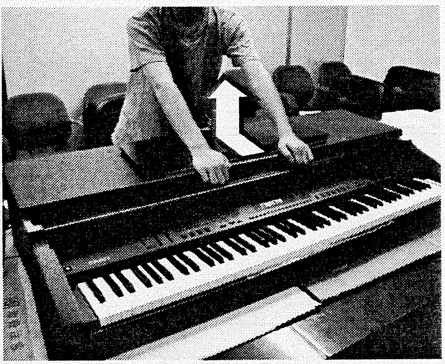
PCB	JCM660	Components
Main PCB	MA1M	CPU, DSP, Sound Source ROM Working storage RAM, Effect RAM Reset IC, DAC, Filter, Key controller, Power amp, Power supply circuit
Jack PCBs	PS2M	LINE IN/OUT jack, MIDI jacks
	PS3M	Phone jacks
	PS4M	Power indicator
Console PCBs	CN1M,CN2M	Tone, Registration, Sequencer, Cursor, Demo
	CN3M	CHANNEL buttons (CH1 to CH16)
	CN4M,CN5M,CN6M	Mode, Volume, Rhythm, Select, Tempo
LCD PCB	LCD1M	LCD driver, CFL drever
Power PCB	JCM431-PS12	Fuse, Noise filter

DISASSEMBLY INSTRUCTIONS

1. Removal of top board

1-1. Remove 8 screws affixing the top board on the back.

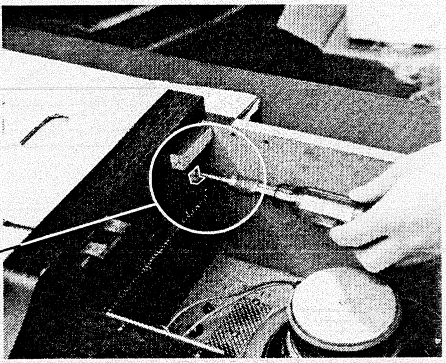
1-2. Slide the top board forward and remove it from the main unit.

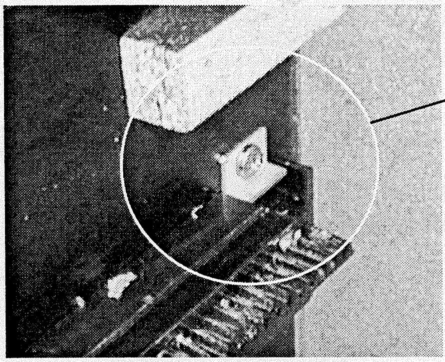


2. Removal of keyboard cover

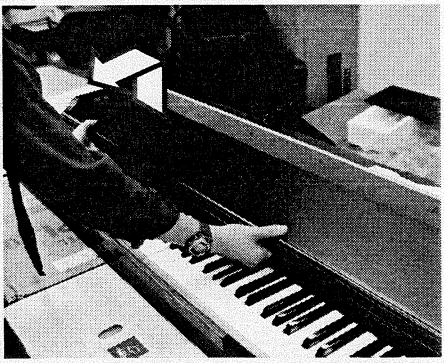
2-1. Lift up the keyboard cover full open position.

2-2. Unscrew the L-shaped stopper metal located on the inner left corner.





2-3. Lift up the keyboard cover gear from the opening where stopper metal is fixed, then remove the keyboard cover.

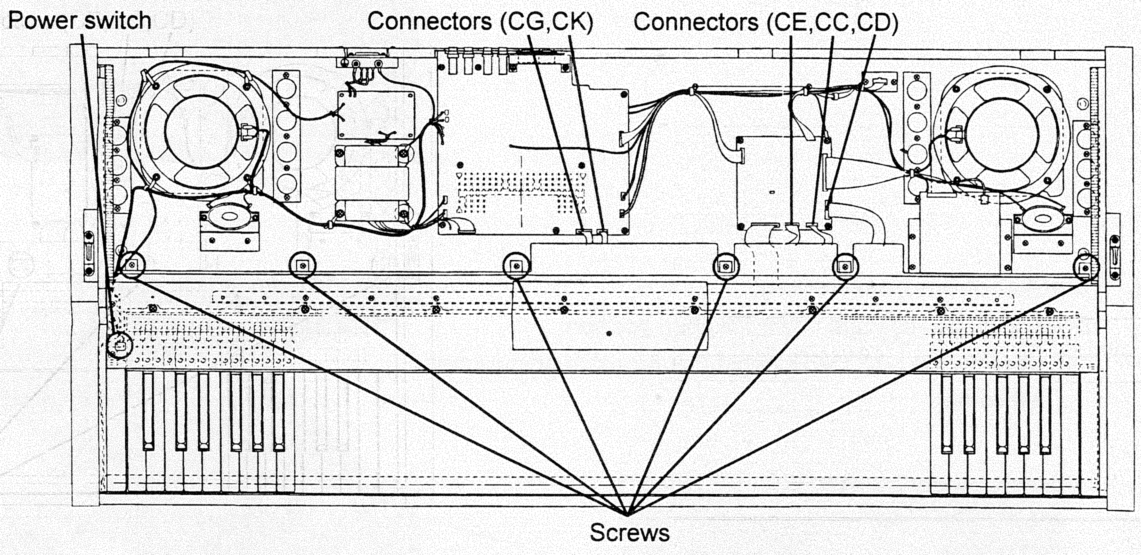


3. Removal of console panel

3-1. Remove 6 screws of the console panel.

3-2. Disconnect connector CC,CD,CE on PCB MA1M, connector CG,CK on PCB PS2M.

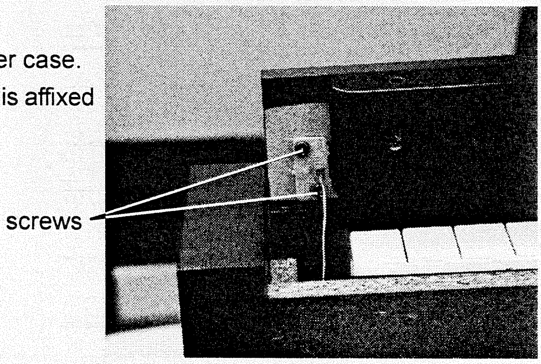
3-3. Lift the console panel and turn it over and remove the power switch, which is affixed by 2 screws. Then remove the side panel.
Caution: Be careful not to scratch the side panels.


Power switch
Connectors (CG,CK)
Connectors (CE,CC,CD)
Screws

4. Removal of front cover

4-1. Remove 6 screws from the front end of the lower case.

4-2. Lift the front cover and remove the pilot lamp that is affixed by 2 screws. Then remove the front cover.

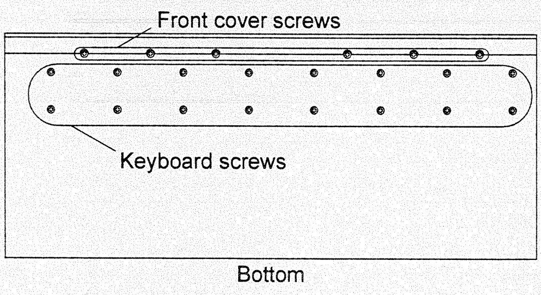


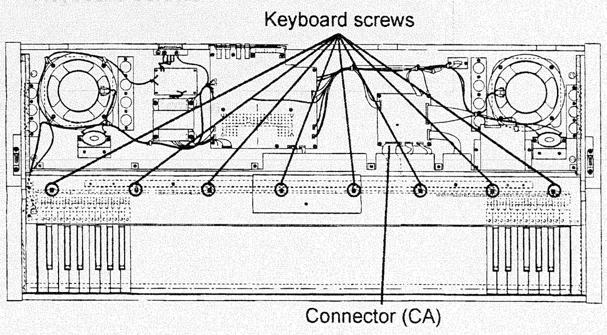
5. Removal of keyboard unit

5-1. Disconnect connector CA on the PCB MA1M.

5-2. Remove 24 screws that affix the keyboard unit (16 on the bottom of the case and 8 on the keyboard unit).

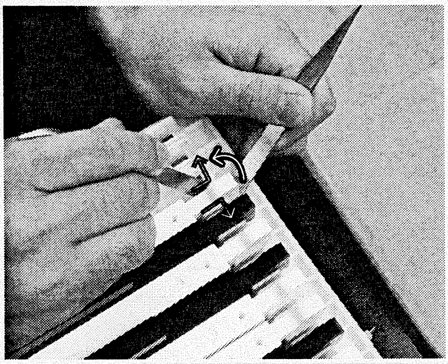
5-3. Lift and remove the keyboard unit.


Front cover screws
Keyboard screws
Bottom


Keyboard screws
Connector (CA)

6. Removal of keys

6-1. While plying the side partition plastics with tweezers, lift the edge of the key toward front.

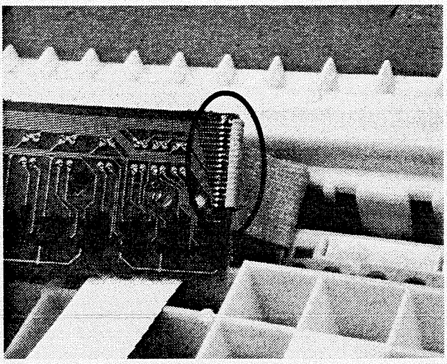


7. Removal of keyboard PCB

7-1. Lay the keyboard so that keyboard PCBs face upward.

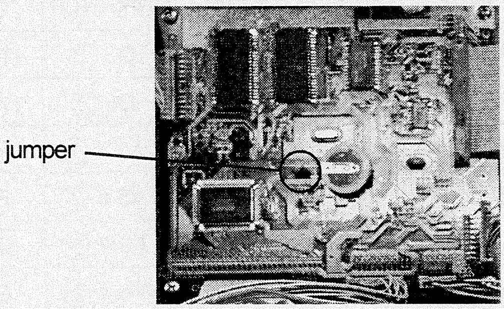
7-2. Remove screws on keyboard PCBs (10 screws on PCBs KY1M and KY3M, 12 screws on KY2M).

7-3. Unsolder the cable.



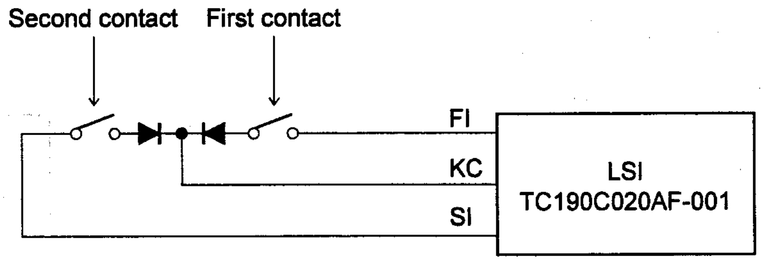
8. Notes on replacing the main PCB.

A lithium battery is set on the main PCB for memory protection.
When you replace the main PCB, disconnect the jumper to open battery circuit.
Since there is no jumper on a new main PCB, be sure to set a jumper.



CIRCUIT DESCRIPTION

KEYMATRIX



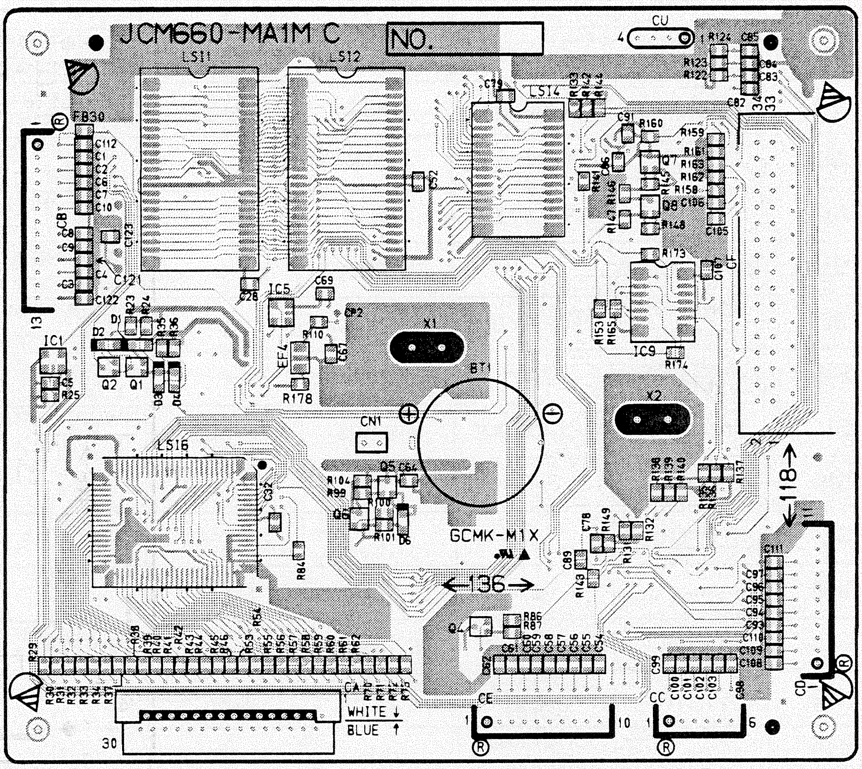
	KC0	KC1	KC2	KC3	KC4	KC5	KC6	KC7
FI0	A0 ①	A0 # ①	B0 ①	C1 ①	C1 # ①	D1 ①	D1 # ①	E1 ①
SI0	A0 ②	A0 # ②	B0 ②	C1 ②	C1 # ②	D1 ②	D1 # ②	E1 ②
EI1	F1 ①	F1 # ①	G1 ①	G1 # ①	A1 ①	A1 # ①	B1 ①	C2 ①
SI1	F1 ②	F1 # ②	G1 ②	G1 # ②	A1 ②	A1 # ②	B1 ②	C2 ②
FI2	C2 # ①	D2 ①	D2 # ①	E2 ①	F2 ①	F2 # ①	G2 ①	G2 # ①
SI2	C2 # ②	D2 ②	D2 # ②	E2 ②	F2 ②	F2 # ②	G2 ②	G2 # ②
FI3	A2 ①	A2 # ①	B2 ①	C3 ①	C3 # ①	D3 ①	D3 # ①	E3 ①
SI3	A2 ②	A2 # ②	B2 ②	C3 ②	C3 # ②	D3 ②	D3 # ②	E3 ②
FI4	F3 ①	F3 # ①	G3 ①	G3 # ①	A3 ①	A3 # ①	B3 ①	C4 ①
SI4	F3 ②	F3 # ②	G3 ②	G3 # ②	A3 ②	A3 # ②	B3 ②	C4 ②
FI5	C4 # ①	D4 ①	D4 # ①	E4 ①	F4 ①	F4 # ①	G4 ①	G4 # ①
SI5	C4 # ②	D4 ②	D4 # ②	E4 ②	F4 ②	F4 # ②	G4 ②	G4 # ②
FI6	A4 ①	A4 # ①	B4 ①	C5 ①	C5 # ①	D5 ①	D5 # ①	E5 ①
SI6	A4 ②	A4 # ②	B4 ②	C5 ②	C5 # ②	D5 ②	D5 # ②	E5 ②
FI7	F5 ①	F5 # ①	G5 ①	G5 # ①	A5 ①	A5 # ①	B5 ①	C6 ①
SI7	F5 ②	F5 # ②	G5 ②	G5 # ②	A5 ②	A5 # ②	B5 ②	C6 ②
FI8	C6 # ①	D6 ①	D6 # ①	E6 ①	F6 ①	F6 # ①	G6 ①	G6 # ①
SI8	C6 # ②	D6 ②	D6 # ②	E6 ②	F6 ②	F6 # ②	G6 ②	G6 # ②
FI9	A6 ①	A6 # ①	B6 ①	C7 ①	C7 # ①	D7 ①	D7 # ①	E7 ①
SI9	A6 ②	A6 # ②	B6 ②	C7 ②	C7 # ②	D7 ②	D7 # ②	E7 ②
FI10	F7 ①	F7 # ①	G7 ①	G7 # ①	A7 ①	A7 # ①	B7 ①	C8 ①
SI10	F7 ②	F7 # ②	G7 ②	G7 # ②	A7 ②	A7 # ②	B7 ②	C8 ②

BUTTON MATRIX

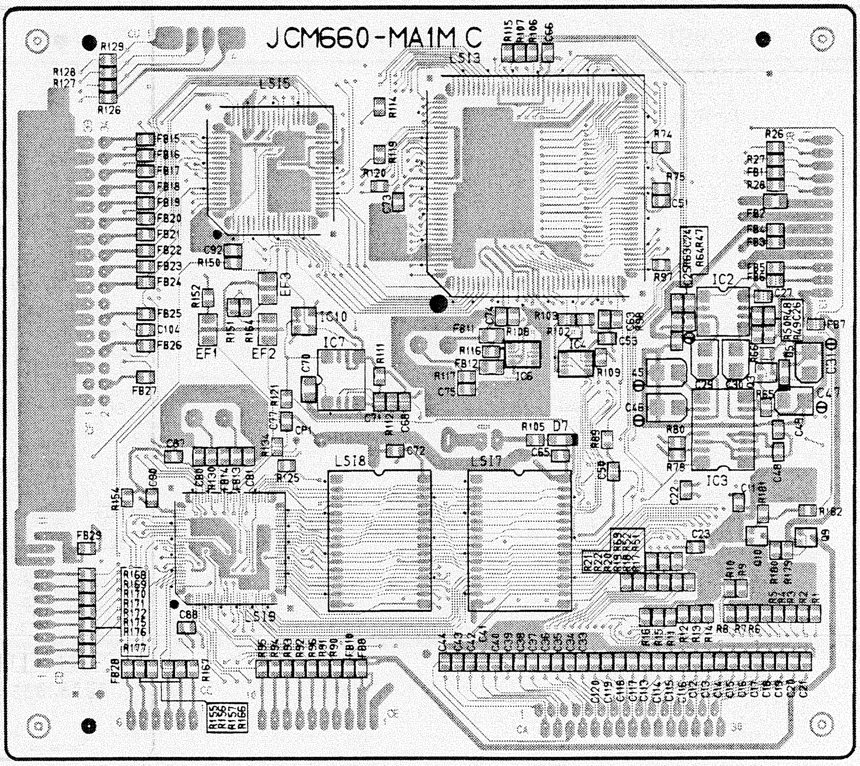
	KC0	KC1	KC2	KC3	KC4	KC5
SI0	MODE	BALLAD	POPS	SELECT	GRAND PIANO BRIGHT PIANO	GUT GUITAR ACOUS GUITAR
SI1	AUTO HARMONIZE	POPS/OLDIES	16BEAT	BANK	E.GRAND PIANO OCTAVE PIANO	HARP VIOLIN
SI2	ONE TOUCH PRESET	JAZZ/RAGTIME	ROCK	A	E.PIANO 1 E.PIANO 2	STRINGS CHOIR
SI3	INTRO	LATIN/CLASSIC	JAZZ	B	HARPSI CHORD CLAVI	BRASS NEWAGE
SI4	NORMAL/FILL-IN	–	EUROPIAN	C	VIBRAPHONE CELESTA	FLUTE CLARINET
SI5	VARIATION/ FILL-IN	OSER/RYTHM	BALL ROOM	D	ACCORDION HONKY-TONK	TENOR SAX TRUMPET
SI6	SYNCRO/ ENDING	–	LATIN	E	PIPE ORGAN E.ORGAN 2	DRUM SET BRIGHTNESS
SI7	STRAT/STOP	METRONOME	VARIOUS	STROE	DRAWBAR ORGAN E.ORGAN 2	DRUM SET BRIGHTNESS
SI8	TEMPO DOWN	4	1	RECORD	ch–	–/NO
SI9	TEMPO UP	5	2	PATTERN	VOLUME +	+/YES
SI10	–	6	3	SONG	ch+	ENTER
SI11	LAYER	CONTRAST	EFFECT	DEMO	VOLUME–	TOUCH RESPONS
SI12	SPLIT	TRANSPOSE DOWN	TRANSPOSE UP	DISK	–	TUNE/MIDI
SI13	–	EXTERNAL/ INTERNAL	ch1	ch2	ch3	ch4
SI14	ch5	ch6	ch7	ch8	ch9	ch10
SI15	ch11	ch12	ch13	ch14	ch15	ch16

PRINT CIRCUIT BOARD

Main PCB JCM660-MA1M

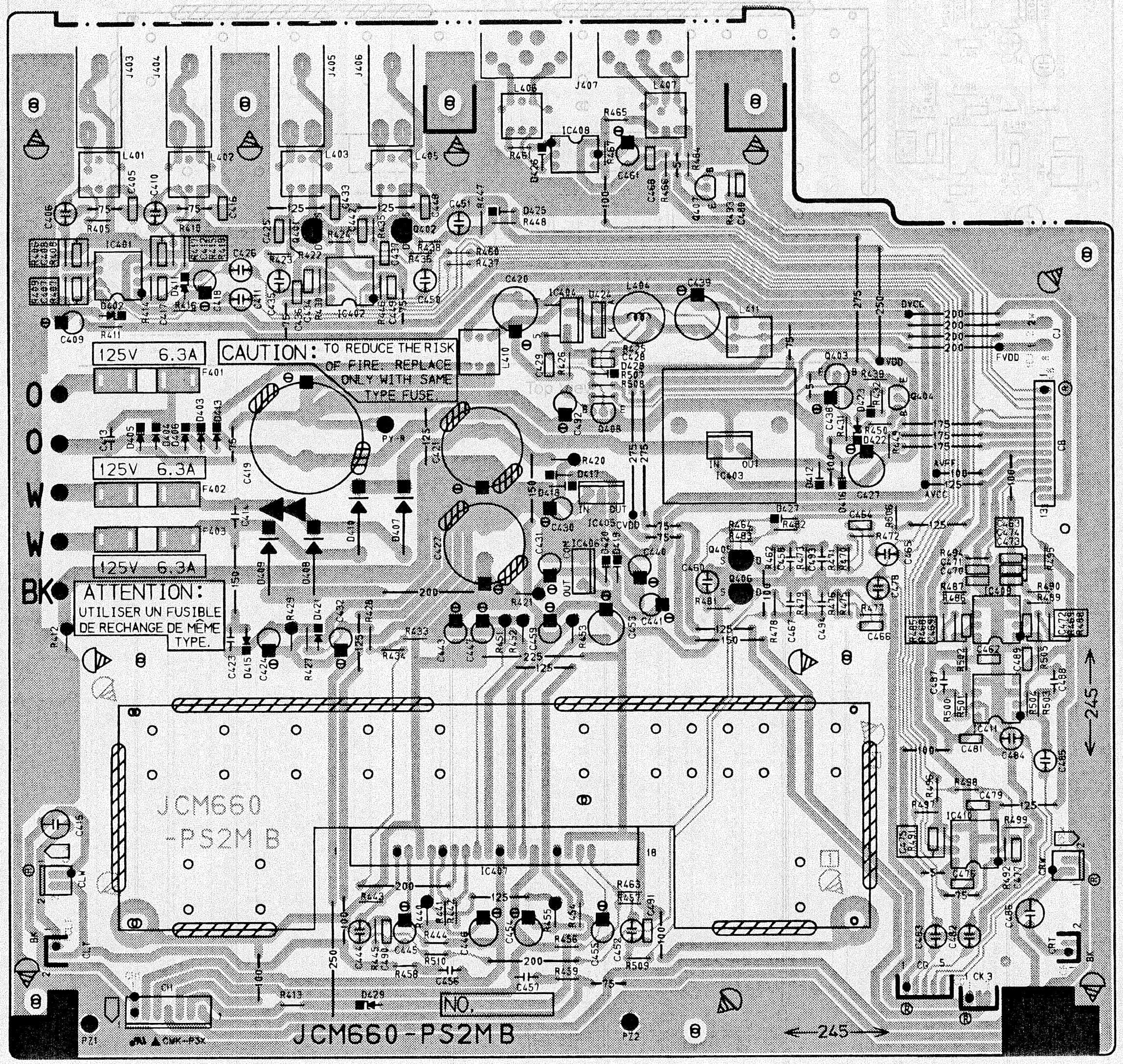

JCM660-MA1M C
NO.
CU
LSI1
LSI2
LSI4
LSI6
IC1
IC5
IC9
X1
X2
BT1
CN1
GCMK-M1X
←136→
←118→
FB30
Q1
Q2
Q4
Q5
Q6
Q7
Q8
D1
D2
EF4
CA
WHITE ↓
BLUE ↑
CE
CC
CB
CD
CF
30
1
10
6
13

Top View


JCM660-MA1M C
LSI3
LSI5
LSI7
LSI8
LSI9
IC2
IC3
IC4
IC6
IC7
IC10
EF1
EF2
EF3
D7
Q9
Q10
FB15
FB16
FB17
FB18
FB19
FB20
FB21
FB22
FB23
FB24
FB25
FB26
FB27
FB28
FB29
CA
36

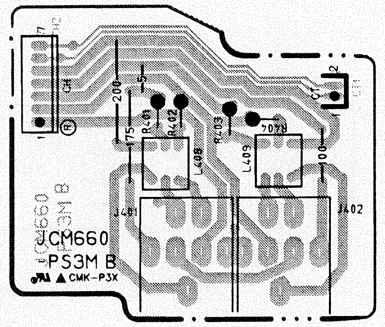
Bottom View

Sub PCB JCM660-PS2M


CAUTION: TO REDUCE THE RISK OF FIRE, REPLACE ONLY WITH SAME TYPE FUSE.
ATTENTION: UTILISER UN FUSIBLE DE RECHANGE DE MÊME TYPE.
125V 6.3A
125V 6.3A
125V 6.3A
F401
F402
F403
O
O
W
W
BK
J403
J404
J405
J406
J407
L401
L402
L403
L405
L406
L407
L410
L404
IC401
IC402
IC403
IC404
IC405
IC406
IC407
IC408
IC409
IC410
Q401
Q402
Q403
Q404
Q405
Q406
CB
CJ
CH
CLW
CLY
CRW
CRT
CK3
CD
DVCC
FVDD
AVFF
AVCC
VDD
CVDD
IN
OUT
COM
PZ1
PZ2
NO.
JCM660 -PS2M B
JCM660-PS2MB
CMK-P3X
245
245

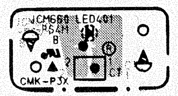
Top View

Sub PCB JCM660-PS3M


CH
J401
J402
L408
L409
R401
R402
R403
R404
200
175
5
100
CI
JCM660 PS3M B
CMK-P3X

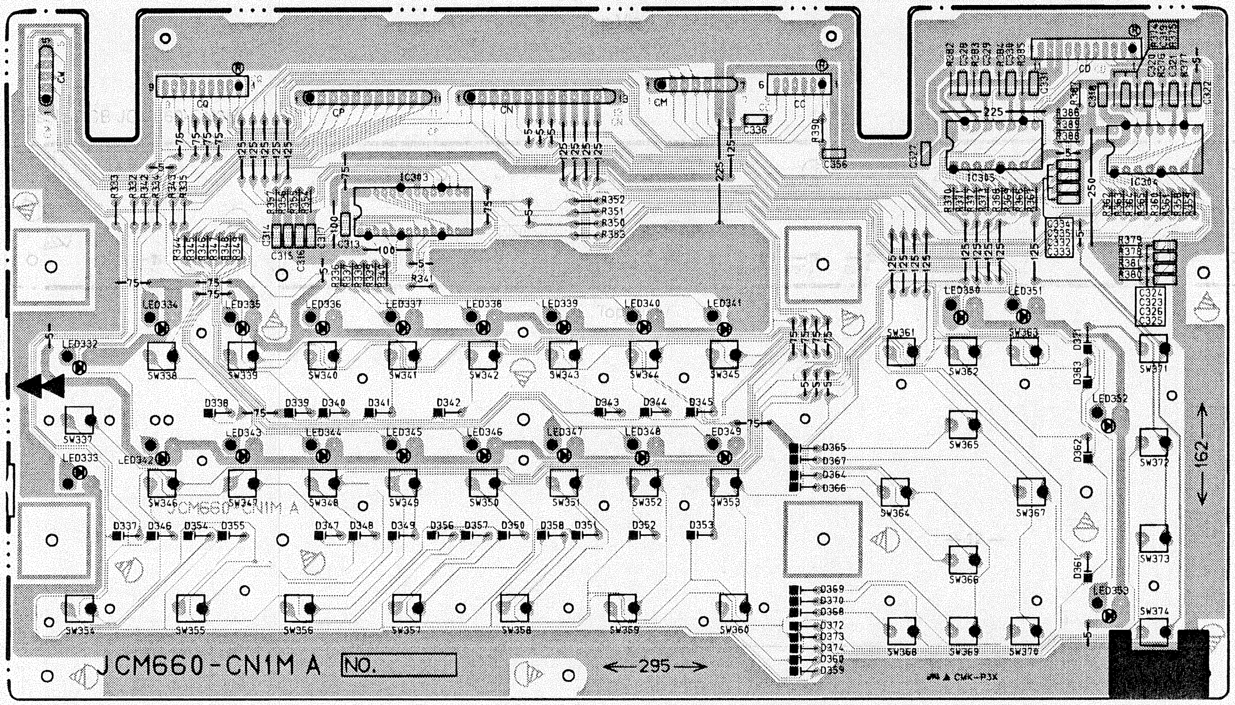
Top View

Sub PCB JCM660-PS4M


JCM660 PS4M B
LED401
CI
CMK-P3X

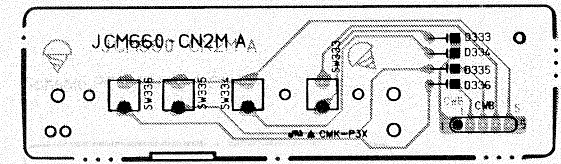
Top View

Console PCB JCM660-CN1M


JCM660-CN1M A
NO.
←295→
162
CMK-P3X
IC303
IC304
IC305
CQ
CP
CN
CM
CC
CD
CW

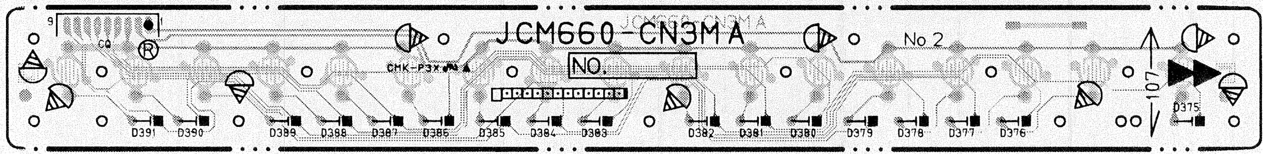
Top View

Console PCB JCM660-CN2M


JCM660-CN2M A
SW333
SW334
SW335
SW336
D333
D334
D335
D336
CWB
CMK-P3X

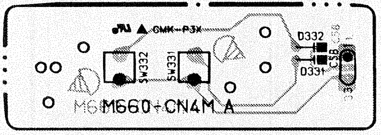
Top View

Console PCB JCM660-CN3M


JCM660-CN3M A
NO.
No 2
107
CQ
CMK-P3X
D391
D390
D389
D388
D387
D386
D385
D384
D383
D382
D381
D380
D379
D378
D377
D376
D375

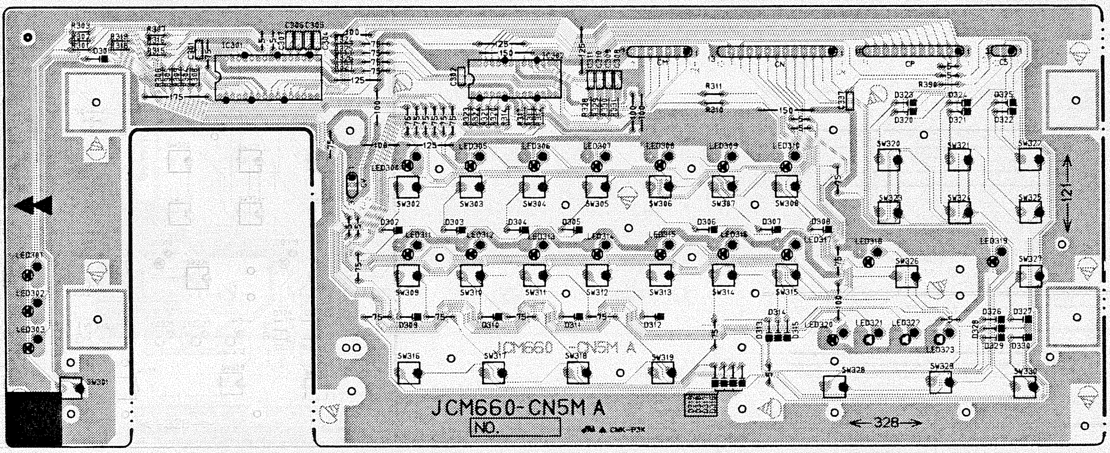
Top View

Console PCB JCM660-CN4M


M660-CN4M A
SW332
SW331
D332
D331
C58
CMK-P3X

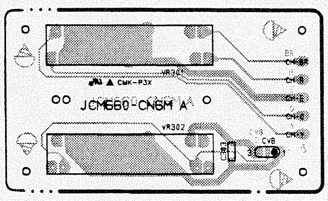
Top View

Console PCB JCM660-CN5M


JCM660-CN5M A
NO.
328
121
CMK-P3X

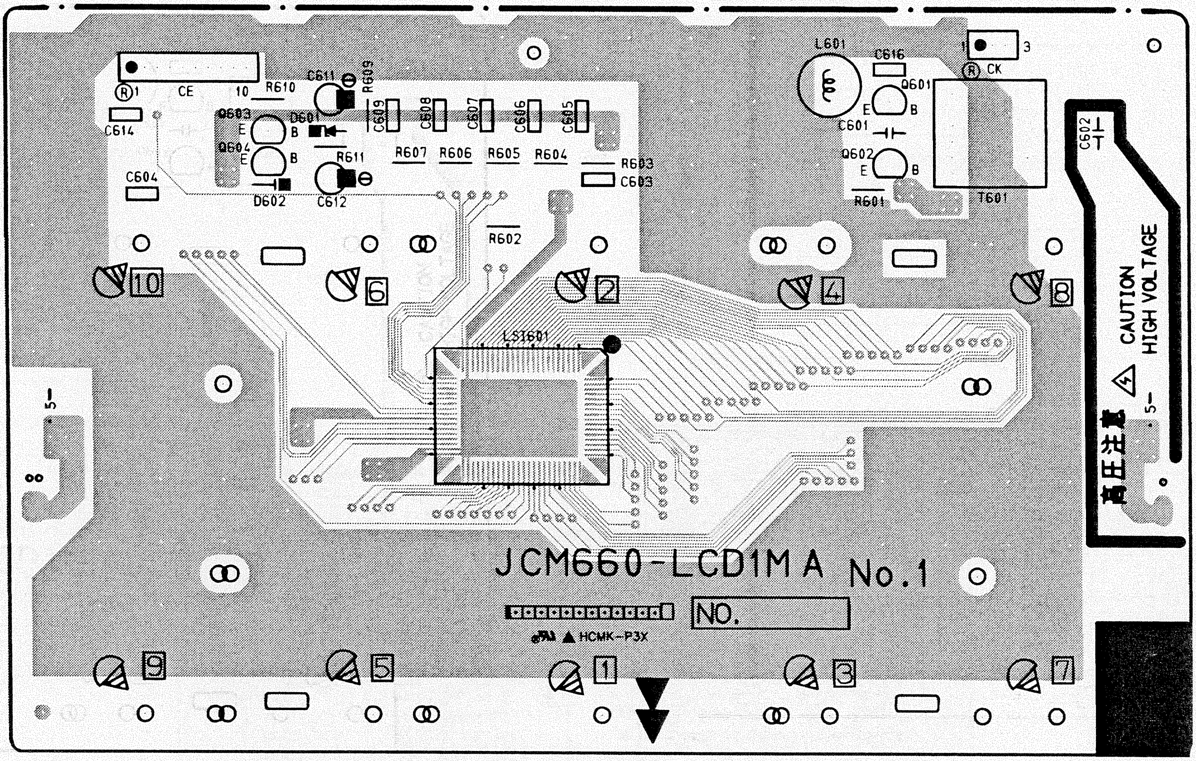
Top View

Console PCB JCM660-CN6M

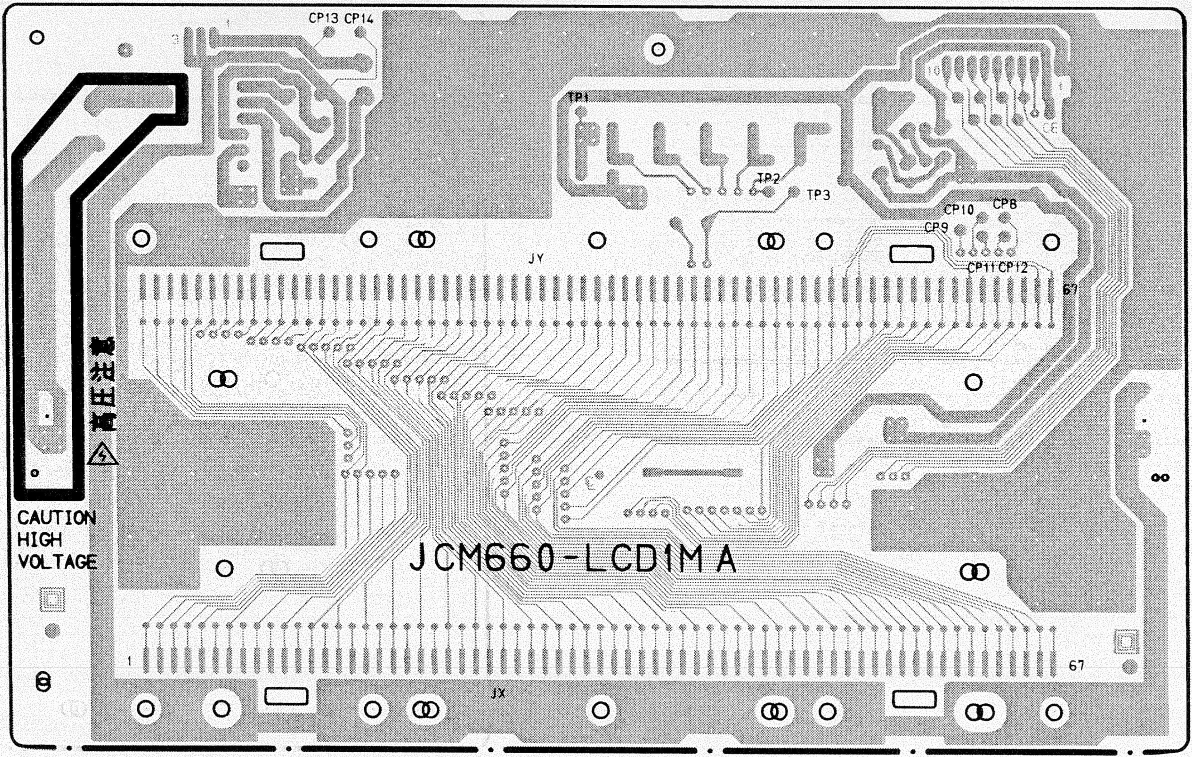

JCM660-CN6M A
VR301
VR302
CMK-P3X

Top View

LCD PCB JCM660-LCD1M


CE
1
10
R610
C611
R609
C609
C608
C607
C606
C605
C614
Q603
E
B
D601
Q604
R611
R607
R606
R605
R604
R603
C603
C604
D602
C612
R602
LSI601
L601
C616
Q601
C601
Q602
R601
T601
CK
3
C602
CAUTION
HIGH VOLTAGE
高圧注意
10
6
2
4
8
JCM660-LCD1M A No.1
NO.
HCMK-P3X
9
5
1
3
7

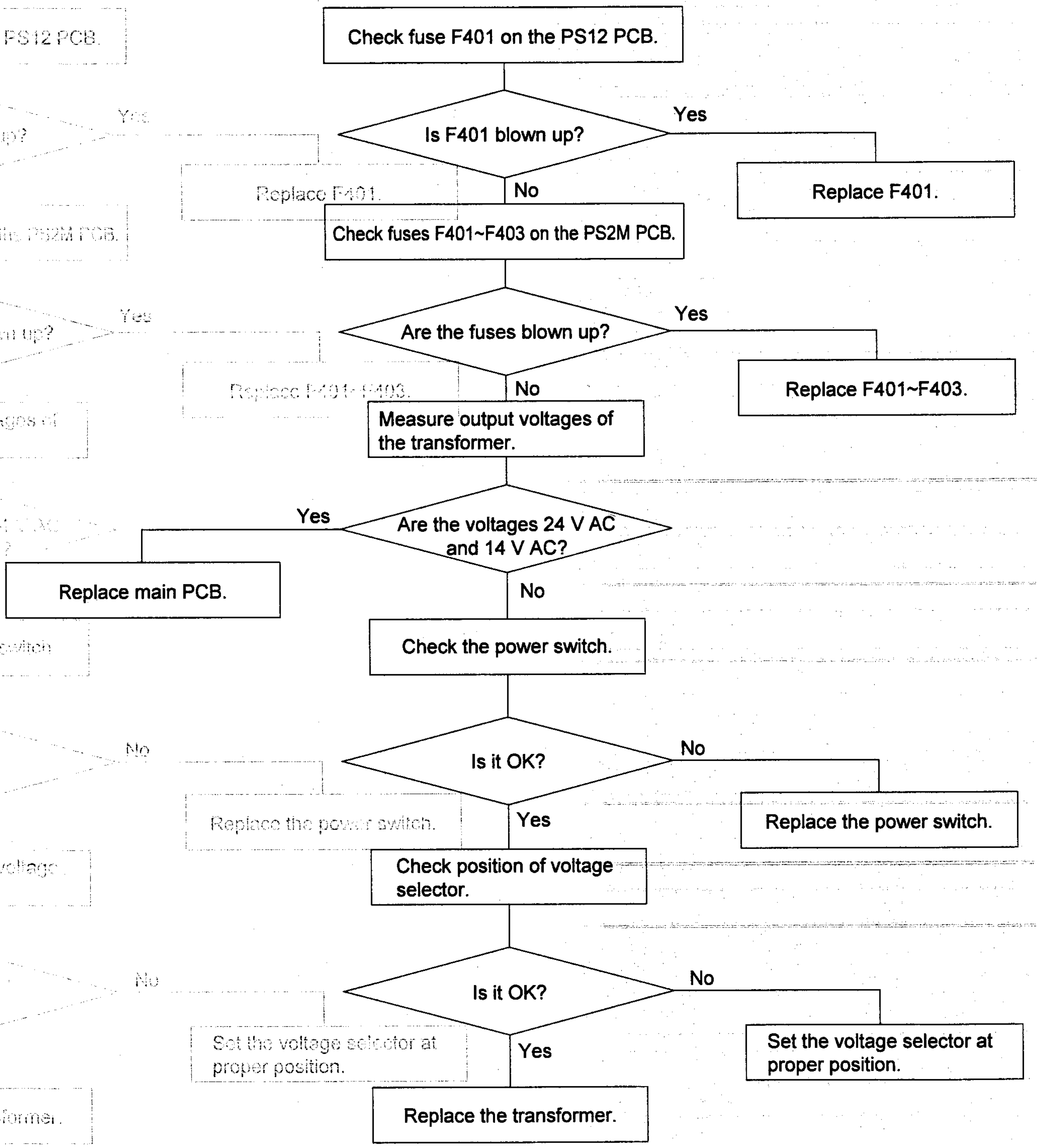
Top View


CP13 CP14
TP1
TP2
TP3
CP10
CP8
CP9
CP11 CP12
JY
67
CAUTION
HIGH
VOLTAGE
高圧注意
JCM660-LCD1M A
1
67
JX

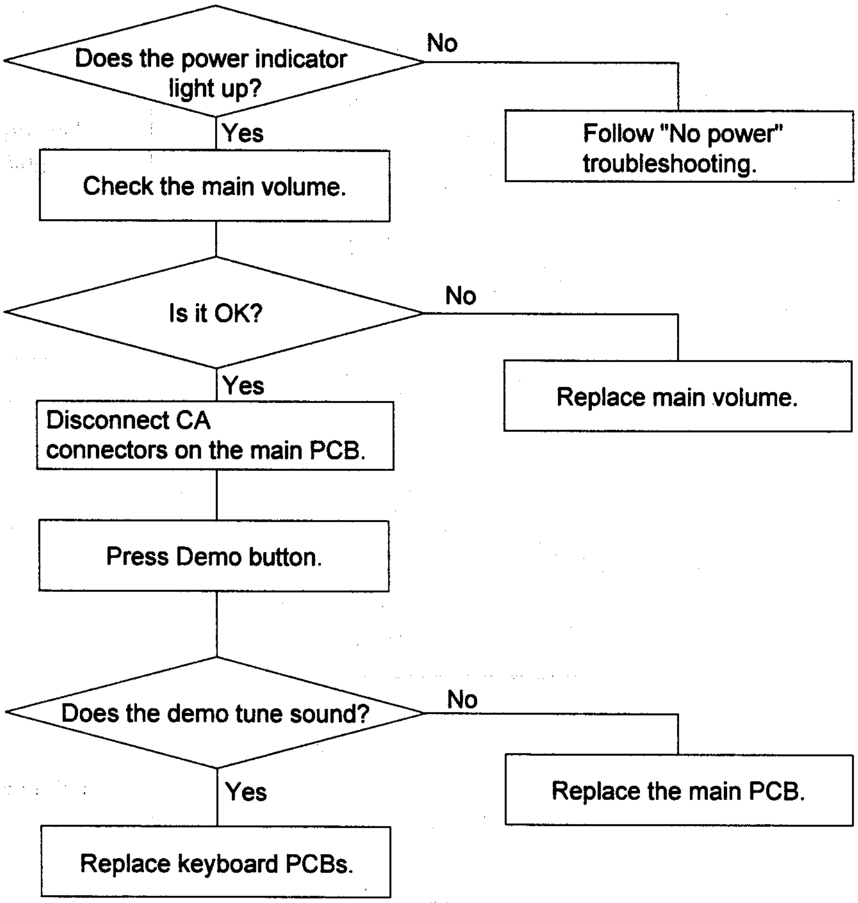
BottomView

TROUBLESHOOTING

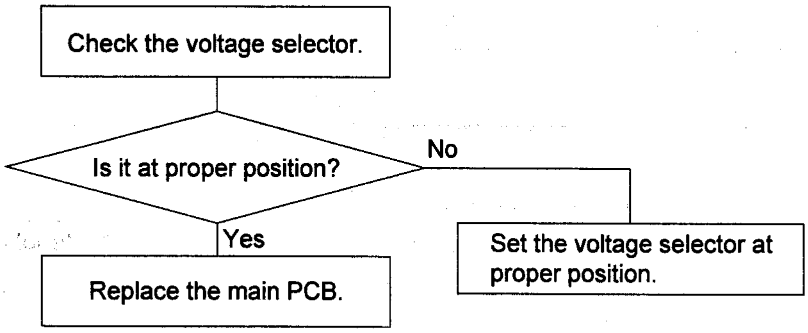
1. No power


Check fuse F401 on the PS12 PCB.
Is F401 blown up?
Yes
Replace F401.
No
Check fuses F401~F403 on the PS2M PCB.
Are the fuses blown up?
Yes
Replace F401~F403.
No
Measure output voltages of the transformer.
Are the voltages 24 V AC and 14 V AC?
Yes
Replace main PCB.
No
Check the power switch.
Is it OK?
No
Replace the power switch.
Yes
Check position of voltage selector.
Is it OK?
No
Set the voltage selector at proper position.
Yes
Replace the transformer.

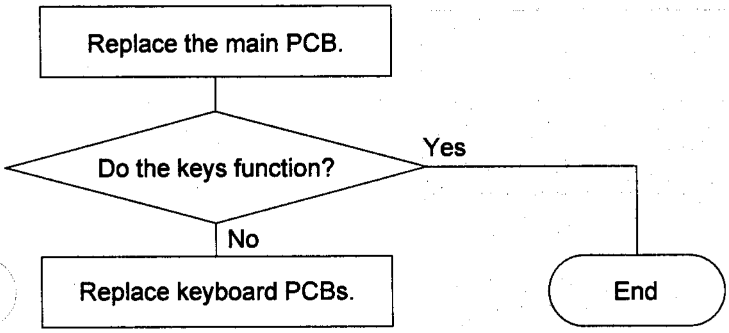
2. No sound


Does the power indicator light up?
No
Follow "No power" troubleshooting.
Yes
Check the main volume.
Is it OK?
No
Replace main volume.
Yes
Disconnect CA connectors on the main PCB.
Press Demo button.
Does the demo tune sound?
No
Replace the main PCB.
Yes
Replace keyboard PCBs.

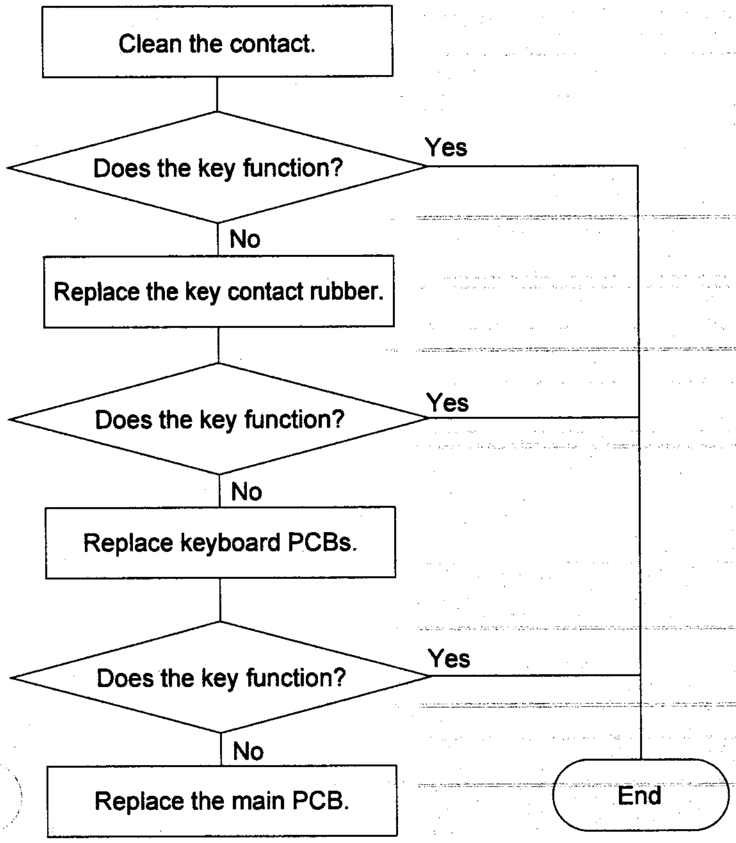
3. Distorted sound


Check the voltage selector.
Is it at proper position?
No
Set the voltage selector at proper position.
Yes
Replace the main PCB.

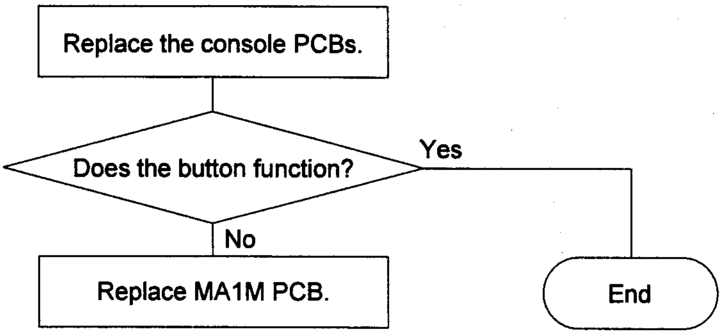
4. Certain keys do not function


Replace the main PCB.
Do the keys function?
Yes
No
Replace keyboard PCBs.
End

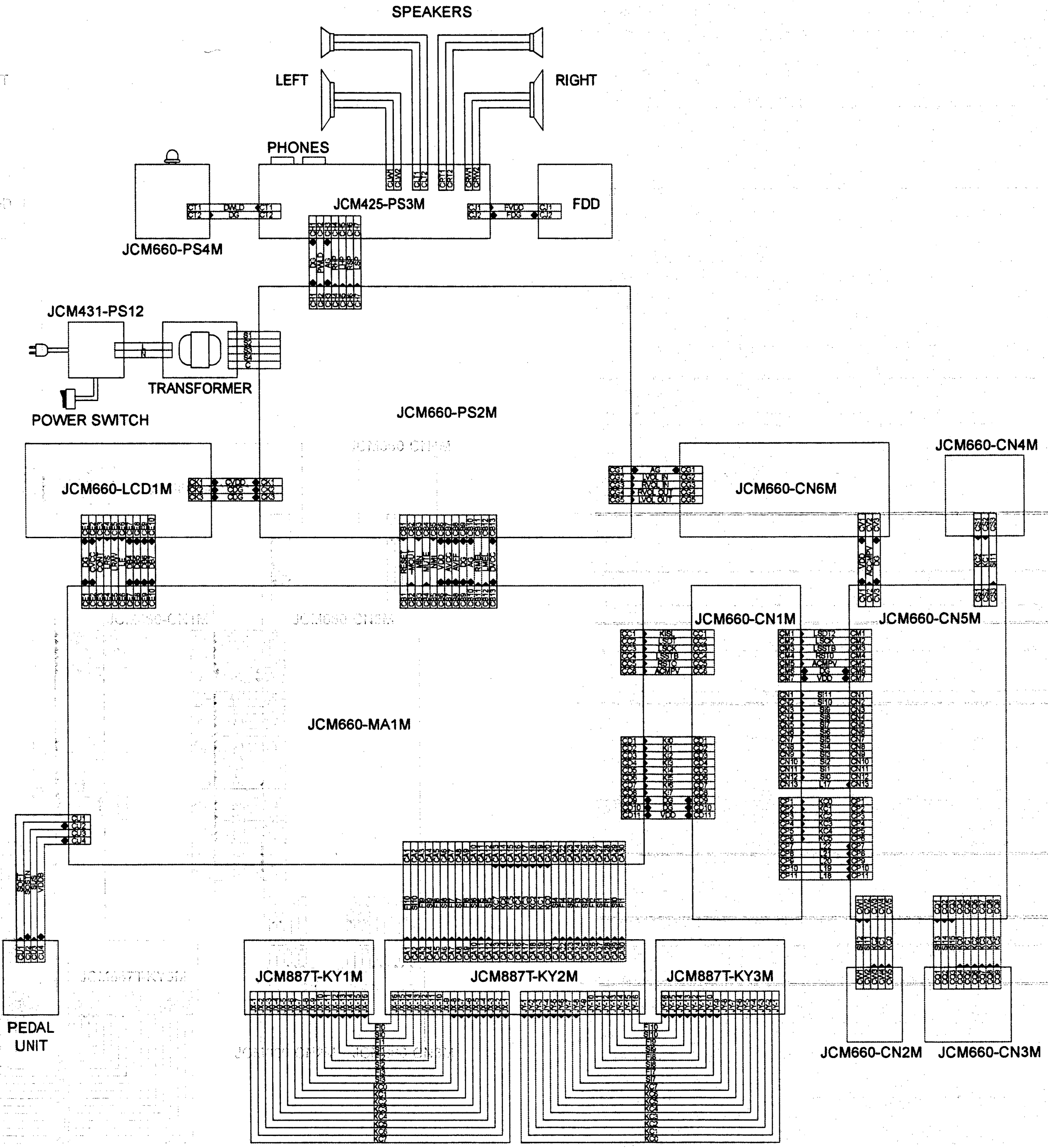
5. A certain key does not function


Clean the contact.
Does the key function?
Yes
No
Replace the key contact rubber.
Does the key function?
Yes
No
Replace keyboard PCBs.
Does the key function?
Yes
No
Replace the main PCB.
End

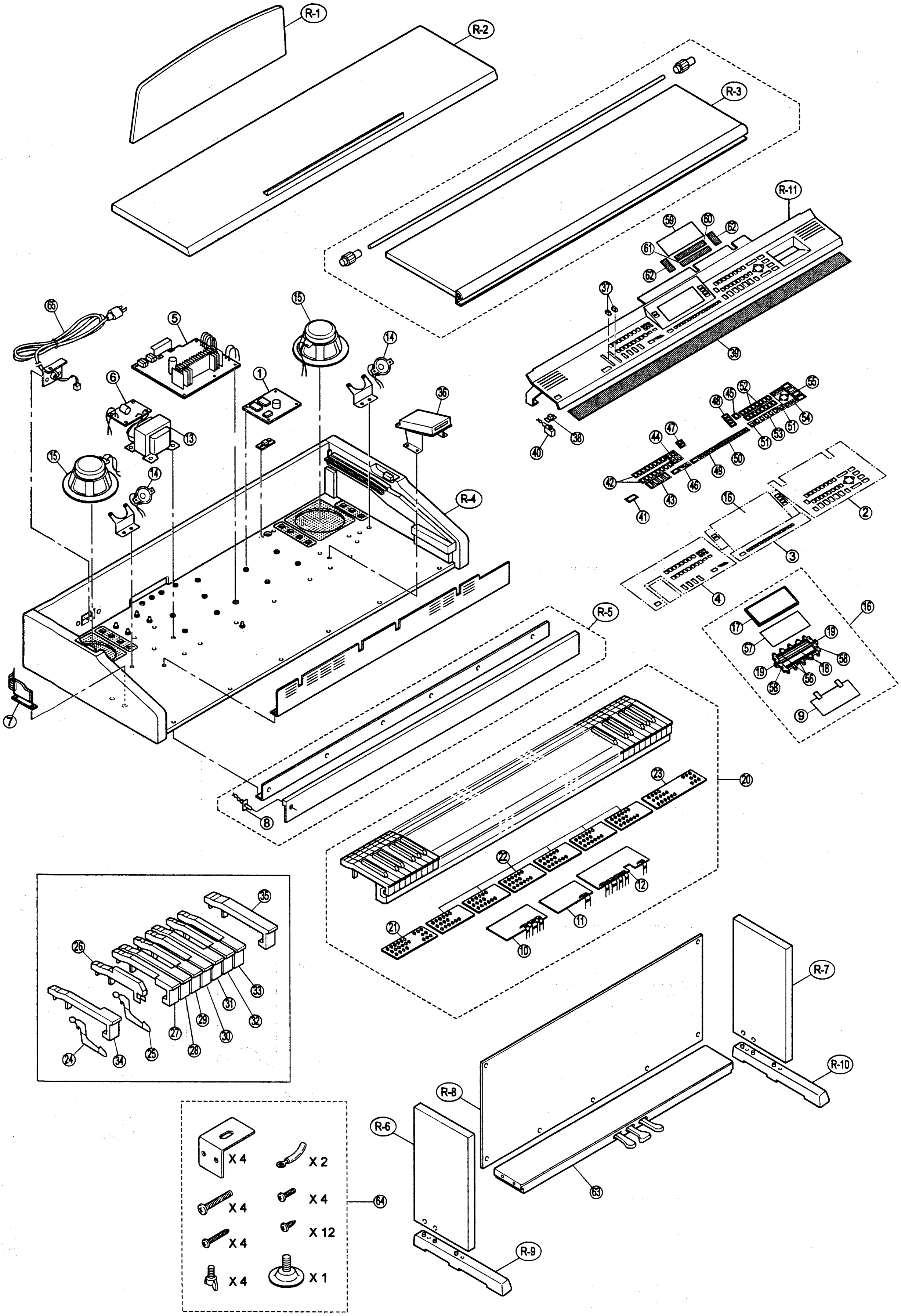
6. A certain button does not function


Replace the console PCBs.
Does the button function?
Yes
No
Replace MA1M PCB.
End

WIRING DIAGRAM


SPEAKERS
LEFT
RIGHT
PHONES
JCM425-PS3M
FDD
JCM660-PS4M
JCM431-PS12
TRANSFORMER
POWER SWITCH
JCM660-PS2M
JCM660-LCD1M
JCM660-CN6M
JCM660-CN4M
JCM660-CN1M
JCM660-CN5M
JCM660-MA1M
PEDAL UNIT
JCM887T-KY1M
JCM887T-KY2M
JCM887T-KY3M
JCM660-CN2M
JCM660-CN3M

EXPLODED VIEW



R-1
R-2
R-3
R-11
59
60
62
61
62
37
39
65
5
15
14
1
6
13
36
15
14
R-4
48
45
52
55
38
54
57
53
51
40
47
44
50
49
46
42
43
41
16
2
3
4
R-5
16
17
57
19
58
18
19
58
56
9
7
8
20
23
22
12
11
21
10
35
26
33
32
31
30
29
28
27
25
34
24
R-7
R-10
R-8
R-6
63
X 4
X 2
X 4
X 4
X 12
X 4
X 4
X 1
64
R-9

PARTS LIST

AP-60R

Notes: This parts list does not include the cosmetic parts, which parts are marked with item No. "R-X" in the exploded view.
Contact our spare parts department if you need these parts for refurbish.

1. Prices and specifications are subject to change without prior notice.

2. As for spare parts order and supply, refer to the "GUIDEBOOK for Spare parts Supply", published seperately.

3. The numbers in item column correspond to the same numbers in drawing.

N	Item	Code No.	Part Name	Specification	Q	R	Remarks
		Main PCB					
	BT1	3815 0707	BATTERY, LITHIUM	CR2032-1HM	1	B	
	D1-D4,D7	2390 1820	DIODE	1SS355TE-17	5	B	
N	D5	2360 2856	DIODE,ZENER	UDZTE-17 5.6B	1	B	
	D6	2360 3057	DIODE	UDZTE-173.3B	1	B	
N	EF1-EF4	3025 1862	FILTER, EMI	NFM51R00P206	4	B	
	IC1,IC5	2105 2821	IC, CMOS	TC7S04F(TE85R)	2	B	
	IC10	2105 1120	IC, CMOS	TC7S08F(TE85R)	1	B	
N	IC2	2114 5898	IC,MONOLITHIC	NJM2068M(TE1)	1	B	
	IC3	2105 6665	LSI	UPD63200GS-E1	1	B	
	IC4	2105 5719	IC, CMOS	TC7W32FU(TE12L)	1	B	
	IC6	2105 6083	IC, CMOS	TC7WU04FU(TE12L)	1	B	
	IC7	2114 4060	IC,MONOLITHIC	MB3771PF-EF	1	B	
	IC9	2101 0642	IC, CMOS	TC74HC08AF(TP1)	1	B	
N	LSI2	2012 6498	LSI	MX23C6410MC12CA108	1	A	
	LSI3	2011 7434	LSI	HG51B155FD	1	A	
	LSI4	2012 5572	LSI	TC55257DFL-70L(EL)	1	A	
	LSI5	2010 9990	LSI	HD63266F	1	A	
	LSI6	2012 5987	LSI	TC190C020AF-001	1	A	
	LSI7,LSI8	2012 6186	LSI	TC551001CF-70L(EL)	2	A	
	LSI9	2012 6466	LSI	HD6473048F16	1	A	
	Q1-Q10	2250 1169	TRANSISTOR	2SA1576AT106S	10	B	
	X1	2590 2788	OSCILATOR, CRYSTAL	AT-49-24.576MHZ	1	B	
	X2	2590 2748	OSCILATOR, CERAMIC	CSA16.00MXZ243	1	B	
	1	6927 7710	PCB ASSY / M660-MA1M	M241139*1	1	A	
		Console PCB					
	D301-D391	2390 1344	DIODE	1SS133T-77	91	B	
	IC301	2105 6679	IC, CMOS	NJU3718L	1	B	
	IC302,IC303	2105 6680	IC, CMOS	NJU3716L	2	B	
N	IC304,IC305	2105 6681	IC, CMOS	TC74HC257AP	2	B	
N	LED301-LED320 LED332-LED353	1000 5470	LED	SLZ-190B-02-T1	42	B	
N	LED321-LED323	1000 5471	LED	SLZ-290B-02-T1	3	B	
	SW301-SW374	3412 0903	SWITCH, TACT	EVQ-21405R	74	B	
	VR301	2765 0280	VOLUME	EWANAXCH1B14	1	B	
	VR302	2765 2187	VOLUME	EWANFECH1B54	1	B	
	2	6927 7810	PCB ASSY / M660-CN1,2M	M241141*1	1	A	
	3	6927 7820	PCB ASSY / M660-CN3M	M341061*1	1	A	
	4	6927 7830	PCB ASSY / M660-CN4,5,6M	M241142*1	1	A	
		Power supply PCB					
	D402,D411	2360 1729	DIODE,ZENER	MTZJ5.1AT-77-T	2	B	
	D403-D406 D413,D415	2390 2996	DIODE	1SR139-400T-32	6	B	
	D407-D410	2390 3099	DIODE	3BZ41(LC5-15)	4	B	
	D412 D416-D420 D423-D427	2390 1344	DIODE	1SS133T-77	10	B	
	D421	2390 1323	DIODE	RB100A-T32-T	1	B	
	D422	2360 2737	DIODE,ZENER	MTZJ10CT-77-T	1	B	
	D424	2390 1463	DIODE,SCHOTTKY	SB20-03B	1	B	
	D428	2390 2828	DIODE,SCHOTTKY	RB441Q-40T-77	1	B	
N	D429	1000 5472	DIODE,ZENER	MTZJ15BT-77-T	1	B	
	F401-F403	3632 0420	FUSE,TIME-LAG	UL-TSC-6.3A-N1	3	A	110 - 127V area
	F401-F403	3632 0427	FUSE,TIME-LAG	(S)T-6.3A	3	A	220 - 240V area
	IC401-IC402 IC409-IC411	2114 5897	IC,MONOLITHIC	NJM2068D	5	B	
	IC403	2114 3444	IC,MONOLITHIC	NJM7805FA	1	B	
	IC404	2114 5896	IC,MONOLITHIC	PQ1CF2	1	B	

Notes: Q - Quantity per unit
R - Rank

N	Item	Code No.	Part Name	Specification	Q	R	Remarks
	IC405	2114 5794	IC,MONOLITHIC	NJM78M15FA	1	B	
	IC406	2114 5795	IC,MONOLITHIC	NJM79M15FA	1	B	
	IC407	2114 2149	IC,HYBRID	STK4152MK2	1	B	
	IC408	2114 1421	IC,PHOTO COUPLER	PC900V	1	B	
	J403,J404	3612 0584	JACK	YKB21-5012	2	A	
	J405,J406	3612 0789	JACK	YKB21-5010	2	A	
	Q401,Q402 Q405,Q406	2254 0551	TRANSISTOR,FET	2SK365-BL(TPE4)	4	B	
	Q403,Q404 Q407,Q408	2250 1592	TRANSISTOR	2SC1740STPR	4	B	
	5	6927 7760	PCB ASSY / M660-PS2M	M241140*2	1	A	110 - 127V area
	5	6927 7770	PCB ASSY / M660-PS2M	M241140*3	1	A	220 - 240V area
		PS12,PS3,PS4M PCBs					
N	F401	3632 0720	FUSE,TIME-LAG	MITEI	1	A	110 - 127V area
N	F401	3631 1045	FUSE,TIME-LAG	MITEI	1	A	220 - 240V area
	J401,J402	3502 2657	JACK,PHONE	YKB22-5006	2	A	
	LED401	2370 1417	LED	SLP-135B-51	1	B	
	6	6927 7730	PCB ASSY / M425-PS1,2	M341012*5	1	B	110 - 127V area
	6	6927 7740	PCB ASSY / M425-PS1,2	M341012*6	1	B	220 - 240V area
	7	6927 7780	PCB ASSY / M660-PS3M	M341059*1	1	B	
	8	6927 7870	PCB ASSY / M660-PS4M	M341060*1	1	B	
		DISPLAY PCB					
	D601	2360 3056	DIODE,ZENER	HZS6A2LTD-T	1	B	
	D602	2390 1344	DIODE	1SS133T-77	1	B	
	LSI601	2012 6016	LSI	SED1278F2A	1	A	
	Q601,Q602	2253 0710	TRANSISTOR	2SD965-R(TA)	2	B	
	Q603	2250 1577	TRANSISTOR	2SA933ASTPS	1	B	
	Q604	2250 1592	TRANSISTOR	2SC1740STPS	1	B	
	T601	3012 1606	TRANSFORMER	TE-CFL5-1M1	1	B	
	9	6927 7850	PCB ASSY / M660-LCD1M	M241143*1	1	B	
		Keyboard PCBs					
	D701-D876	2390 3043	DIODE	1S2076TE	176	B	
	10	6927 3270	PCB ASSY / M887T-KY1M	M240951*1	1	C	
	11	6927 3780	PCB ASSY / M887T-KY2M	M240952*1	1	C	
	12	6927 5610	PCB ASSY / M887T-KY3M	M241019*1	1	C	
		Other electrical parts					
	13	3012 1618	TRANSFORMER	TE-660-1M1	1	B	110 - 127V area
	13	3012 1619	TRANSFORMER	TE-660-2M1	1	B	220 - 240V area
	14	3831 1075	SPEAKER	S05JH37A	2	B	
	15	3831 1077	SPEAKER	SG16G51BFA	2	B	
	16	6927 7840	BL ASSY	M241135*1	1	B	
	17	3335 6876	LCD	LD-B10500E	1	C	
	18	3122 3736	CFL	HMBV4BG2W178NLUAZG	1	B	
	19	6927 3420	HOLDER / CFL	M440758-1	2	C	
		Keyboard unit					
	20	6927 3230	KY ASSY	M140830*1	1	B	
	21	6927 3980	RUBBER / CONTACT AB	M240957-1	1	A	
	22	6927 3990	RUBBER / CONTACT CB	M240958-1	6	A	
	23	6927 4000	RUBBER / CONTACT CS	M240959-1	1	A	
	24	6927 3250	HAMMER ASSY / WHITE KEY	M340962*1	52	B	
	25	6927 3260	HAMMER ASSY / BLACK KEY	M340963*1	36	B	
	26	6927 4030	BLACK KEY	M140784-1	36	A	
	27	6927 4040	WHITE KEY / C	M140783-1	7	A	
	28	6927 4050	WHITE KEY / D	M140785-1	7	A	
	29	6927 4060	WHITE KEY / E	M140786-1	7	A	
	30	6927 4070	WHITE KEY / F	M140787-1	7	A	
	31	6927 4080	WHITE KEY / G	M140788-1	7	A	
	32	6927 4090	WHITE KEY / A.	M140789-1	7	A	

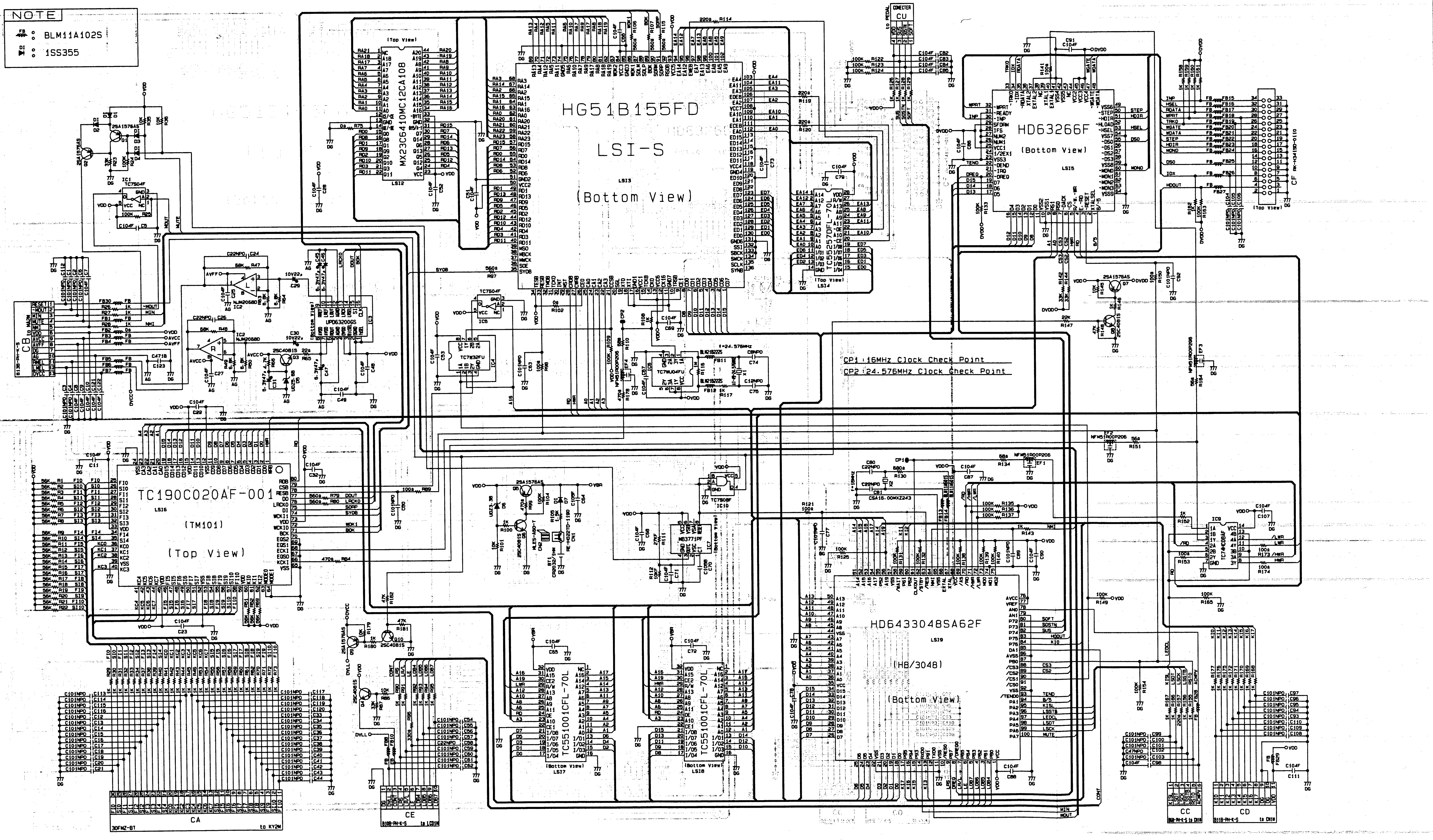
Notes: Q - Quantity per unit
R - Rank

N	Item	Code No.	Part Name	Specification	Q	R	Remarks
	31	6927 4080	WHITE KEY / G	M140788-1	7	A	
	32	6927 4090	WHITE KEY / A.	M140789-1	7	A	
	33	6927 4100	WHITE KEY / B	M140790-1	8	A	
	34	6927 4110	WHITE KEY / SA	M140792-1	1	A	
	35	6927 4120	WHITE KEY / SC	M140791-1	1	A	
		Mechanical parts					
	36	1015 1485	FDD	DF354H064C	1	B	
	37	6921 5032	KNOB / SLIDE	M311859B-1 (1)	2	B	
	38	6924 5260	BUTTON / POWER	M340318-1	1	B	
	39	6927 6600	FELT / KEY	M440829-1	1	C	
	40	6927 7800	SW ASSY / POWER	M341019*2	1	B	
	41	6928 2630	BUTTON / RUBBER / 660A	M341002-1	2	B	
	42	6928 2640	BUTTON / RUBBER / 660B	M241040-1	2	B	
	43	6928 2651	BUTTON / RUBBER / 660C	M241041A-1	1	B	
	44	6928 2660	BUTTON / RUBBER / 660D	M241042-1	1	B	
	45	6928 2670	BUTTON / RUBBER / 660E	M341021-1	1	B	
	46	6928 2680	BUTTON / RUBBER / 660F	M241043-1	1	B	
	47	6928 2690	BUTTON / RUBBER / 660G	M241044-1	1	B	
	48	6928 2700	BUTTON / RUBBER / 660H	M241045-1	1	B	
	49	6928 2710	BUTTON / RUBBER / 660I	M241046-1	1	B	
	50	6928 2720	BUTTON / RUBBER / 660J	M241047-1	1	B	
	51	6928 2730	BUTTON / RUBBER / 660K	M341022-1	2	B	
	52	6928 2740	BUTTON / RUBBER / 660L	M241048-1	2	B	
	53	6928 2751	BUTTON / RUBBER / 660M	M241049A-1	1	B	
	54	6928 2760	BUTTON / RUBBER / 660N	M241050-1	1	B	
	55	6928 2770	BUTTON / RUBBER / 660P	M241039-1	1	B	
	56	6928 2790	CONNECTOR	M440837-1	1	B	
	57	6928 2800	FILM	M341053-1	1	C	
	58	6928 2810	PACKING	M440868-1	2	C	
	59	6928 2820	PLATE / DISPLAY	M341020-1	1	C	
	60	1000 5478	TAPE / ADHESIVE	M440950-1	1	C	
	61	1000 5480	TAPE / ADHESIVE	M440951-1	1	C	
	62	1000 5482	TAPE / ADHESIVE	M440952-1	2	C	
		Stand					
	63	6928 0391	PEDAL-BOX	M241122A*1	1	B	
	64	6928 3210	SCREW SET	M440872*1	1	B	
		AC cord					
	65	6927 7690	AC-CORD-ASSY	M341018*4	1	C	110 -127V area
	65	3701 1008	CORD-SET	SP22-17022A	1	C	UK(230V)
	65	3701 0595	CORD-SET	EC-654-E06	1	C	Europe(230V)
		Accessories					
		6928 3260	FLOPPY-DISK	AP60R-DISK-1	1	C	
		6928 3270	FLOPPY-DISK	AP60R-DISK-2	1	C	

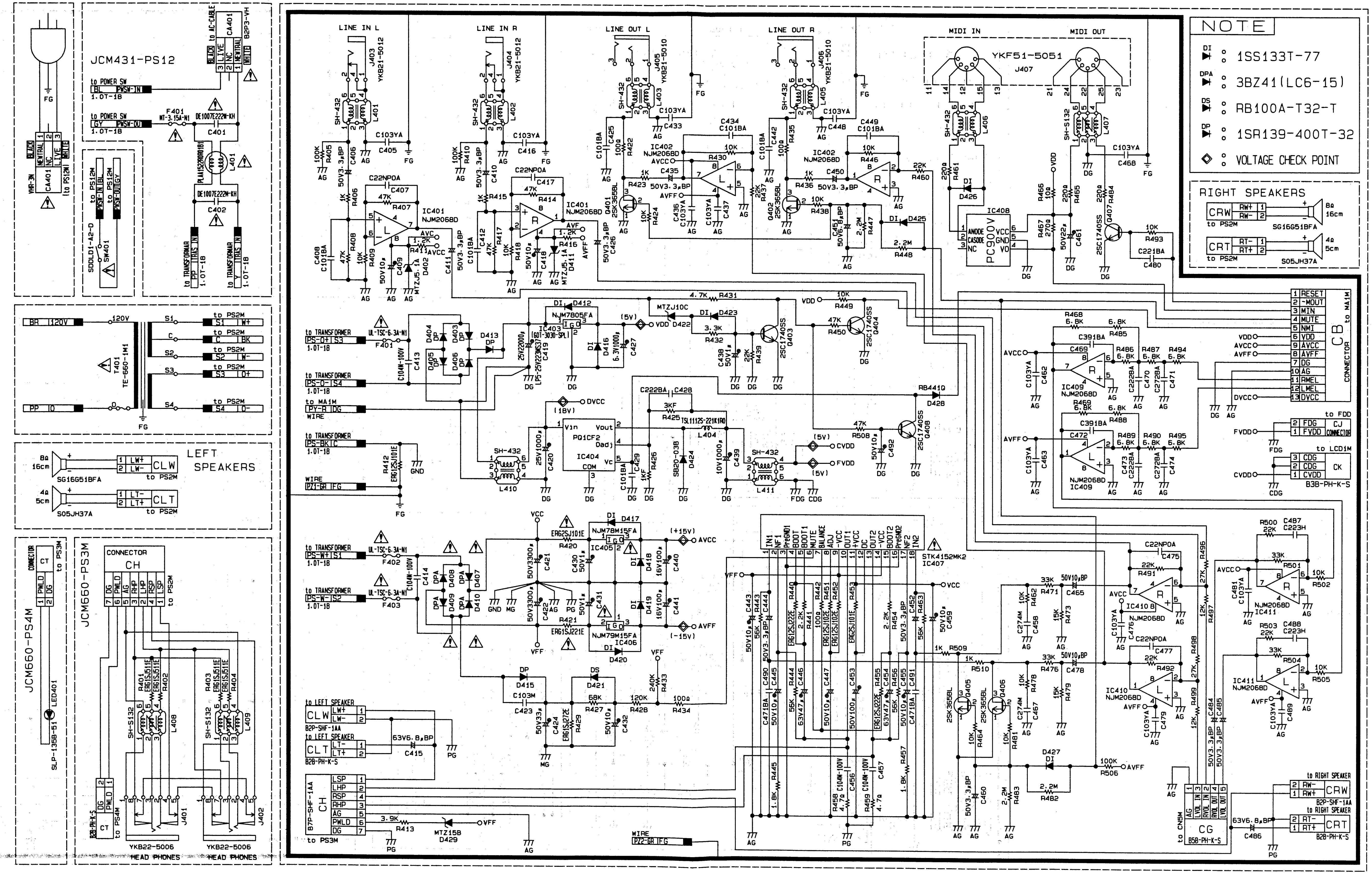
Notes: Q - Quantity per unit
R - Rank

SCHEMATIC DIAGRAMS

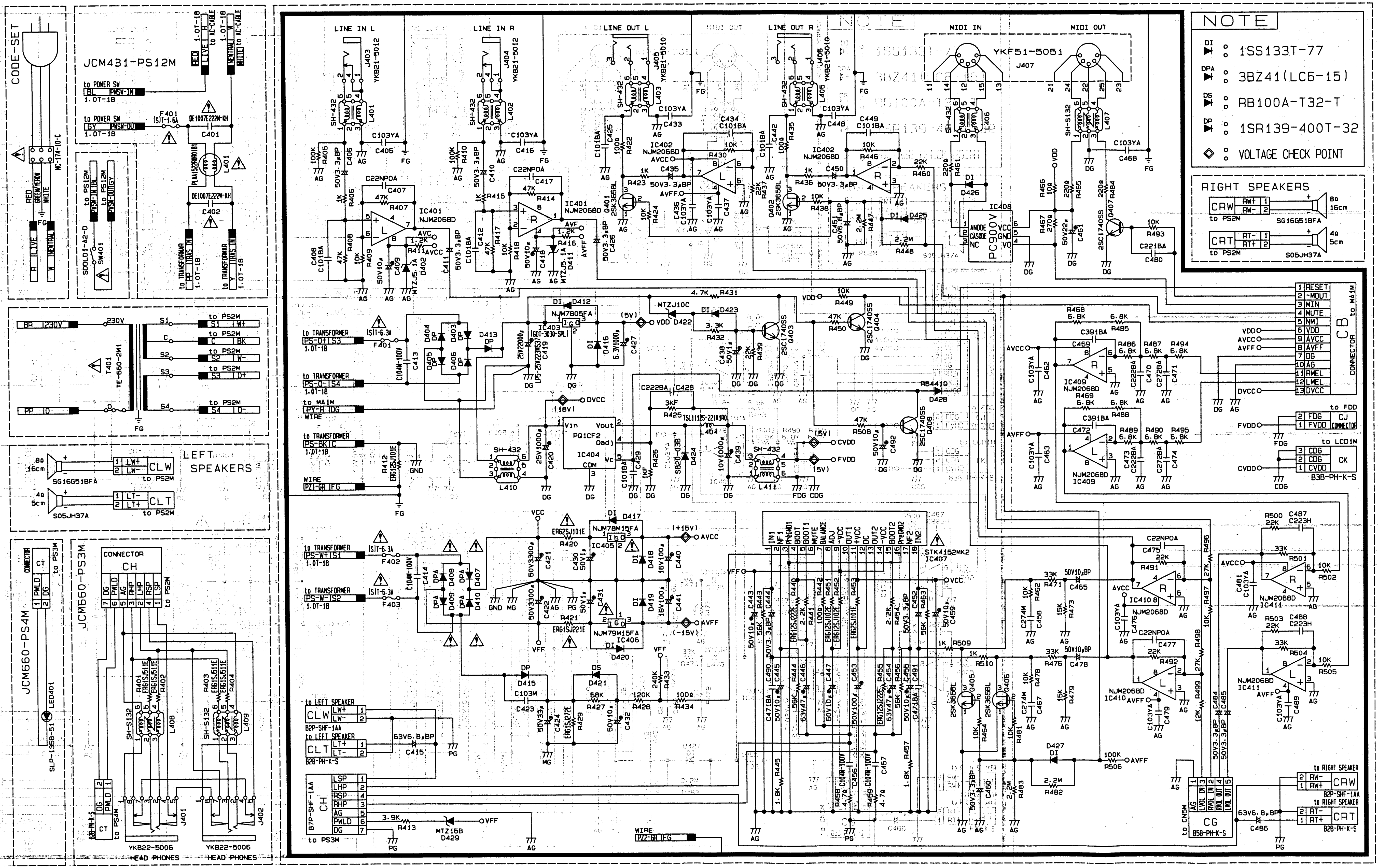
MAIN PCB JCM660-MA1M


NOTE
FB BLM11A102S
DI 1SS355
HG51B155FD
LSI-S
LS13
(Bottom View)
MX23C6410MC12CA108
LS12
(Top View)
HD63266F
LS15
(Bottom View)
TC55257DFL-70L
LS14
(Top View)
CU
CONECTER
to PEDAL
CP1 : 16MHz Clock Check Point
CP2 : 24.576MHz Clock Check Point
TC7S04F
IC1
IC6
NJM2068D
IC2
UPD63200GS
IC3
TC7W32FU
IC4
TC7WU04FU
IC5
CB
TC190C020AF-001
LS16
(TM101)
(Top View)
MB3771PF
IC7
TC7S08F
IC10
TC74HC08AF
IC9
HD6433048SA62F
LS19
(H8/3048)
(Bottom View)
CSA16.00MX2243
TC551001CFL-70L
LS17
LS18
(Bottom View)
CR2032/1HM
CA
30FMZ-BT
to KY2M
CE
B10B-PH-K-S
to LCD1M
CC
to DH1M
CD
to DH1M
CF
FK-H34190-0110
MIN
MOUT

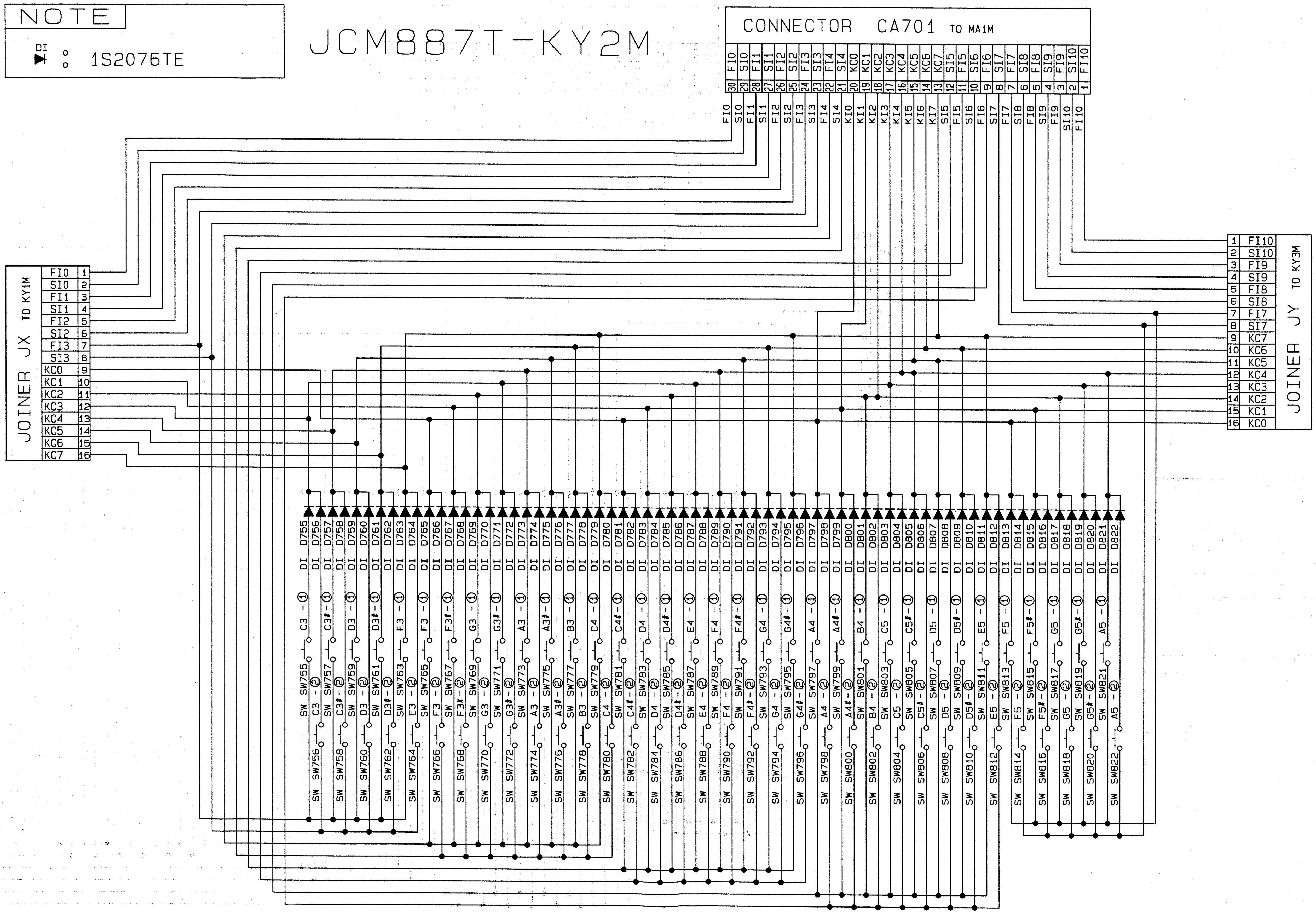
PHONE JACK PCBs JCM660-PS2M,PS3M,PS4M and POWER PCBs JCM431-PS12 (120 V area)


JCM431-PS12
to POWER SW
1.0T-1B
F401
DE1007E222M-KH
C401
C402
L401
to AC-CABLE
B2P3-VH
CA401
YHR-3N
FG
SDDLD1-A2-0
SW401
to TRANSFORMAR
to PS12M
T401
TE-660-1M1
120V
S1
S2
S3
S4
to PS2M
LEFT SPEAKERS
8Ω 16cm
SG16G51BFA
4Ω 5cm
S05JH37A
CLW
CLT
JCM660-PS4M
LED401
SLP-1358-51
JCM660-PS3M
CONNECTOR
CH
to PS2M
to PS3M
to PS4M
J401
J402
L408
L409
YKB22-5006
HEAD PHONES
LINE IN L
LINE IN R
LINE OUT L
LINE OUT R
J403
J404
J405
J406
YKB21-5012
YKB21-5010
SH-432
IC401
NJM2068D
IC402
NJM2068D
MIDI IN
MIDI OUT
YKF51-5051
J407
IC408
PC900V
Q407
2SC1740SS
NOTE
DI : 1SS133T-77
DPA : 3BZ41(LC6-15)
DS : RB100A-T32-T
DP : 1SR139-400T-32
◇ : VOLTAGE CHECK POINT
RIGHT SPEAKERS
CRW
CRT
SG16G51BFA
S05JH37A
8Ω 16cm
4Ω 5cm
IC403
NJM7805FA
IC404
PQ1CF2
L404
L410
L411
Q403
Q404
Q408
2SC1740SS
CB CONNECTOR
to MA1M
RESET
~MOUT
MIN
MUTE
NMI
VDD
AVCC
AVFF
DG
AG
RMEL
LMEL
DVCC
IC409
NJM2068D
to FDD
CJ
FDG
FVDD
to LCD1M
CK
CDG
CVDD
B3B-PH-K-S
IC405
NJM78M15FA
IC406
NJM79M15FA
(+15V)
(-15V)
STK4152MK2
IC407
IC410
NJM2068D
IC411
NJM2068D
Q405
Q406
2SK365BL
to LEFT SPEAKER
B2P-SHF-1AA
B2B-PH-K-S
B7P-SHF-1AA
LSP
LHP
RSP
RHP
PWLD
MTZ15B
D429
to PS3M
WIRE
PZ2-6A
to RIGHT SPEAKER
CG
B5B-PH-K-S
to CN5M
AVFF
AVCC
VCC
VFF
MG
PG
GND

PHONE JACK PCBs JCM660-PS2M,PS3M,PS4M and POWER PCBs JCM431-PS12 (230 V area)


CODE-SET
JCM431-PS12M
to POWER SW
F401
to TRANSFORMER
SDDLD1-A2-D
SW401
T401
TE-660-2M1
230V
to PS2M
LEFT SPEAKERS
CLW
CLT
SG16G51BFA
S05JH37A
JCM660-PS4M
JCM660-PS3M
CONNECTOR
CH
LED401
SLP-1358-51
YKB22-5006
HEAD PHONES
J401
J402
LINE IN L
LINE IN R
LINE OUT L
LINE OUT R
MIDI IN
MIDI OUT
YKF51-5051
J407
J403
J404
J405
J406
IC401 NJM2068D
IC402 NJM2068D
IC403 NJM7805FA
IC404 PQ1CF2
IC405 NJM78M15FA
IC406 NJM79M15FA
IC407 STK4152MK2
IC408 PC900V
IC409 NJM2068D
IC410 NJM2068D
IC411 NJM2068D
to MAIN
CB
CONNECTOR
to FDD
CJ
to LCD1M
CK
to RIGHT SPEAKER
CRW
CRT
CG
to CN5M
NOTE
DI : 1SS133T-77
DPA : 3BZ41(LC6-15)
DS : RB100A-T32-T
DP : 1SR139-400T-32
◇ : VOLTAGE CHECK POINT
RIGHT SPEAKERS
CRW
to PS2M
8Ω 16cm
SG16G51BFA
CRT
to PS2M
4Ω 5cm
S05JH37A

KEYBOARD PCB JCM887T-KT2M

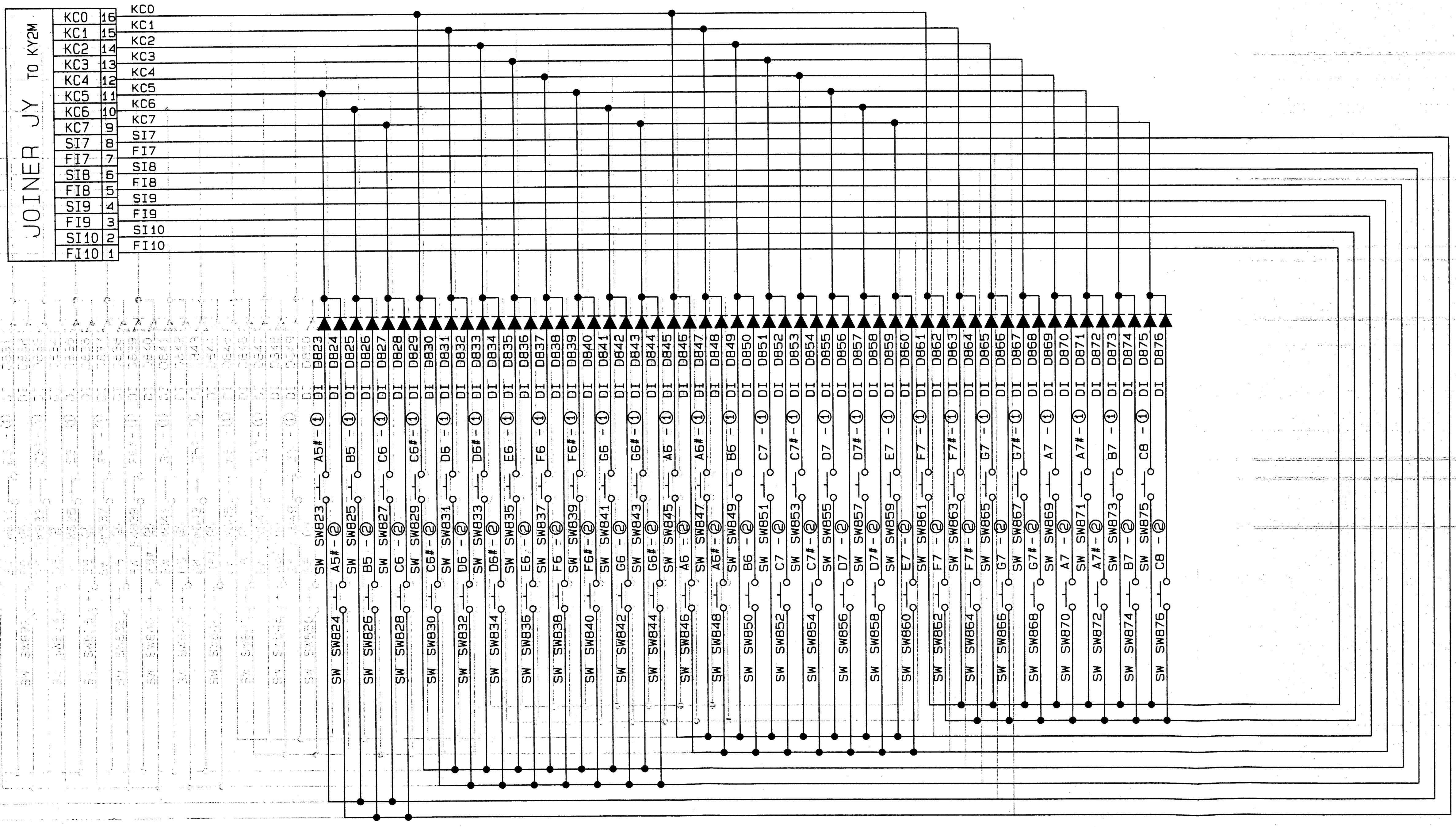

NOTE
DI
1S2076TE
JCM887T-KY2M
CONNECTOR CA701 TO MA1M
30 FI0
29 SI0
28 FI1
27 SI1
26 FI2
25 SI2
24 FI3
23 SI3
22 FI4
21 SI4
20 KC0
19 KC1
18 KC2
17 KC3
16 KC4
15 KC5
14 KC6
13 KC7
12 SI5
11 FI5
10 SI6
9 FI6
8 SI7
7 FI7
6 SI8
5 FI8
4 SI9
3 FI9
2 SI10
1 FI10
FI0
SI0
FI1
SI1
FI2
SI2
FI3
SI3
FI4
SI4
KI0
KI1
KI2
KI3
KI4
KI5
KI6
KI7
SI5
FI5
SI6
FI6
SI7
FI7
SI8
FI8
SI9
FI9
SI10
FI10
JOINER JX TO KY1M
FI0 1
SI0 2
FI1 3
SI1 4
FI2 5
SI2 6
FI3 7
SI3 8
KC0 9
KC1 10
KC2 11
KC3 12
KC4 13
KC5 14
KC6 15
KC7 16
JOINER JY TO KY3M
1 FI10
2 SI10
3 FI9
4 SI9
5 FI8
6 SI8
7 FI7
8 SI7
9 KC7
10 KC6
11 KC5
12 KC4
13 KC3
14 KC2
15 KC1
16 KC0
DI D755
DI D756
DI D757
DI D758
DI D759
DI D760
DI D761
DI D762
DI D763
DI D764
DI D765
DI D766
DI D767
DI D768
DI D769
DI D770
DI D771
DI D772
DI D773
DI D774
DI D775
DI D776
DI D777
DI D778
DI D779
DI D780
DI D781
DI D782
DI D783
DI D784
DI D785
DI D786
DI D787
DI D788
DI D789
DI D790
DI D791
DI D792
DI D793
DI D794
DI D795
DI D796
DI D797
DI D798
DI D799
DI D800
DI D801
DI D802
DI D803
DI D804
DI D805
DI D806
DI D807
DI D808
DI D809
DI D810
DI D811
DI D812
DI D813
DI D814
DI D815
DI D816
DI D817
DI D818
DI D819
DI D820
DI D821
DI D822
SW SW755 C3 -①
SW SW756 C3 -②
SW SW757 C3# -①
SW SW758 C3# -②
SW SW759 D3 -①
SW SW760 D3 -②
SW SW761 D3# -①
SW SW762 D3# -②
SW SW763 E3 -①
SW SW764 E3 -②
SW SW765 F3 -①
SW SW766 F3 -②
SW SW767 F3# -①
SW SW768 F3# -②
SW SW769 G3 -①
SW SW770 G3 -②
SW SW771 G3# -①
SW SW772 G3# -②
SW SW773 A3 -①
SW SW774 A3 -②
SW SW775 A3# -①
SW SW776 A3# -②
SW SW777 B3 -①
SW SW778 B3 -②
SW SW779 C4 -①
SW SW780 C4 -②
SW SW781 C4# -①
SW SW782 C4# -②
SW SW783 D4 -①
SW SW784 D4 -②
SW SW785 D4# -①
SW SW786 D4# -②
SW SW787 E4 -①
SW SW788 E4 -②
SW SW789 F4 -①
SW SW790 F4 -②
SW SW791 F4# -①
SW SW792 F4# -②
SW SW793 G4 -①
SW SW794 G4 -②
SW SW795 G4# -①
SW SW796 G4# -②
SW SW797 A4 -①
SW SW798 A4 -②
SW SW799 A4# -①
SW SW800 A4# -②
SW SW801 B4 -①
SW SW802 B4 -②
SW SW803 C5 -①
SW SW804 C5 -②
SW SW805 C5# -①
SW SW806 C5# -②
SW SW807 D5 -①
SW SW808 D5 -②
SW SW809 D5# -①
SW SW810 D5# -②
SW SW811 E5 -①
SW SW812 E5 -②
SW SW813 F5 -①
SW SW814 F5 -②
SW SW815 F5# -①
SW SW816 F5# -②
SW SW817 G5 -①
SW SW818 G5 -②
SW SW819 G5# -①
SW SW820 G5# -②
SW SW821 A5 -①
SW SW822 A5 -②

KEYBOARD PCB JCM887T-KT3M

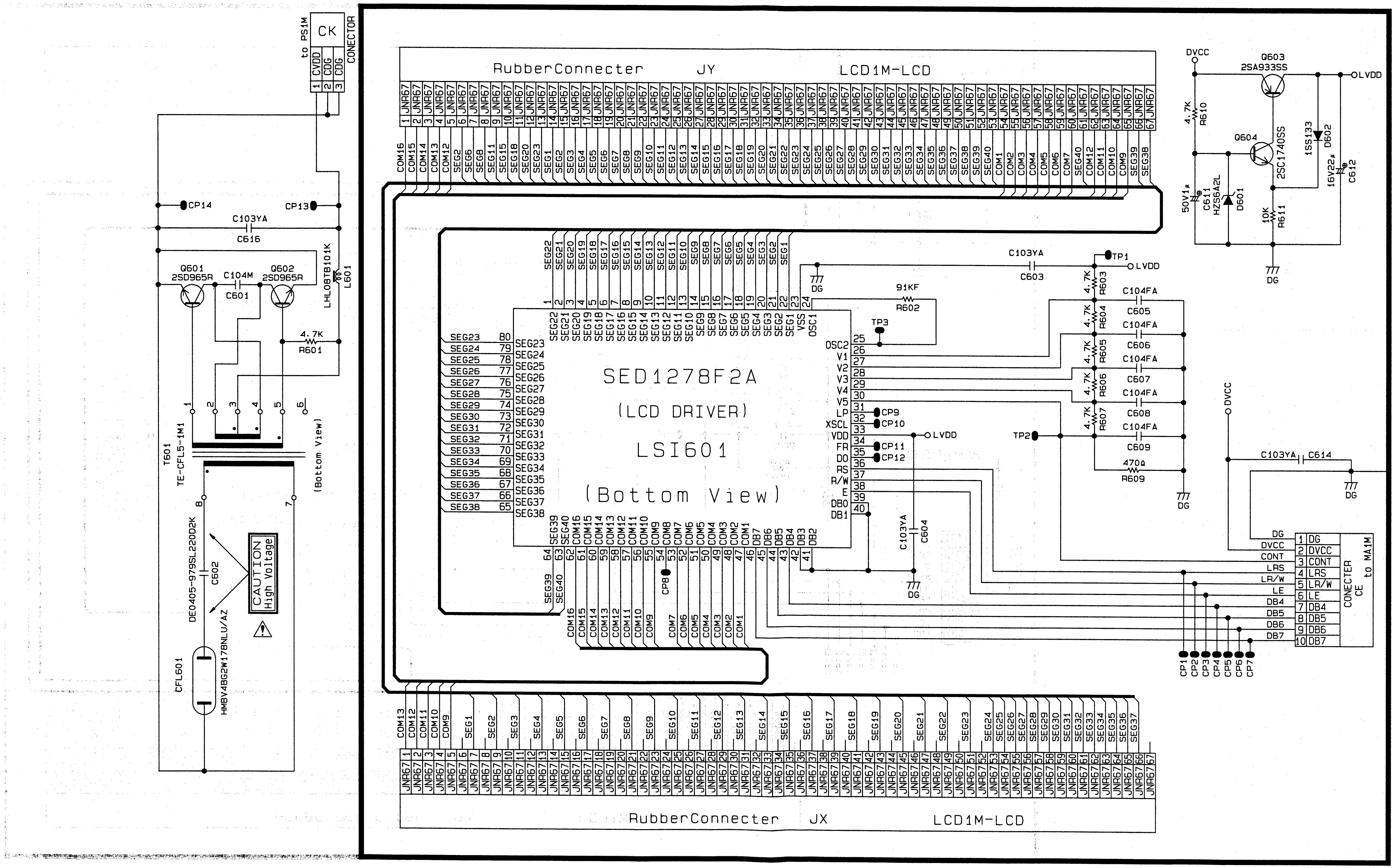
JCM887T-KY3M

NOTE

DI : 1S2076TE


JOINER JY TO KY2M
KC0 16
KC1 15
KC2 14
KC3 13
KC4 12
KC5 11
KC6 10
KC7 9
SI7 8
FI7 7
SI8 6
FI8 5
SI9 4
FI9 3
SI10 2
FI10 1
DI D823 … DI D876
A5#-① A5#-② B5-① B5-② C6-① C6-② C6#-① C6#-② D6-① D6-② D6#-① D6#-② E6-① E6-② F6-① F6-② F6#-① F6#-② G6-① G6-② G6#-① G6#-② A6-① A6-② A6#-① A6#-② B6-① B6-② C7-① C7-② C7#-① C7#-② D7-① D7-② D7#-① D7#-② E7-① E7-② F7-① F7-② F7#-① F7#-② G7-① G7-② G7#-① G7#-② A7-① A7-② A7#-① A7#-② B7-① B7-② C8-① C8-②
SW SW823 … SW SW876

LCD PCB JCM660-LCD1M


CK
CONECTOR
to PS1M
1 CVDD
2 CDG
3 CDG
CP14
CP13
C103YA
C616
Q601
2SD965R
C104M
C601
Q602
2SD965R
LHL08TB101K
L601
4.7K
R601
T601
TE-CFL5-1M1
(Bottom View)
DE0405-979SL220D2K
C602
CAUTION
High Voltage
CFL601
HMBV4BG2W178NLU/AZ
RubberConnecter JY LCD1M-LCD
JNR67
RubberConnecter JX LCD1M-LCD
SED1278F2A
(LCD DRIVER)
LSI601
(Bottom View)
VSS
OSC1
OSC2
V1
V2
V3
V4
V5
LP
XSCL
VDD
FR
DO
RS
R/W
E
DB0
DB1
DB2
DB3
DB4
DB5
DB6
DB7
COM1
COM16
SEG1
SEG40
TP1
TP2
TP3
CP1
CP2
CP3
CP4
CP5
CP6
CP7
CP8
CP9
CP10
CP11
CP12
LVDD
DG
91KF
R602
C103YA
C603
C604
4.7K
R603
R604
R605
R606
R607
C104FA
C605
C606
C607
C608
C609
470Ω
R609
DVCC
Q603
2SA933SS
4.7K
R610
Q604
2SC1740SS
1SS133
D602
16V22μ
C612
50V1μ
C611
HZS6A2L
D601
10K
R611
C103YA
C614
1 DG
2 DVCC
3 CONT
4 LRS
5 LR/W
6 LE
7 DB4
8 DB5
9 DB6
10 DB7
CONECTER
CE
to MA1M